

MONTHLY PROGRESS REPORT ★ SECTION

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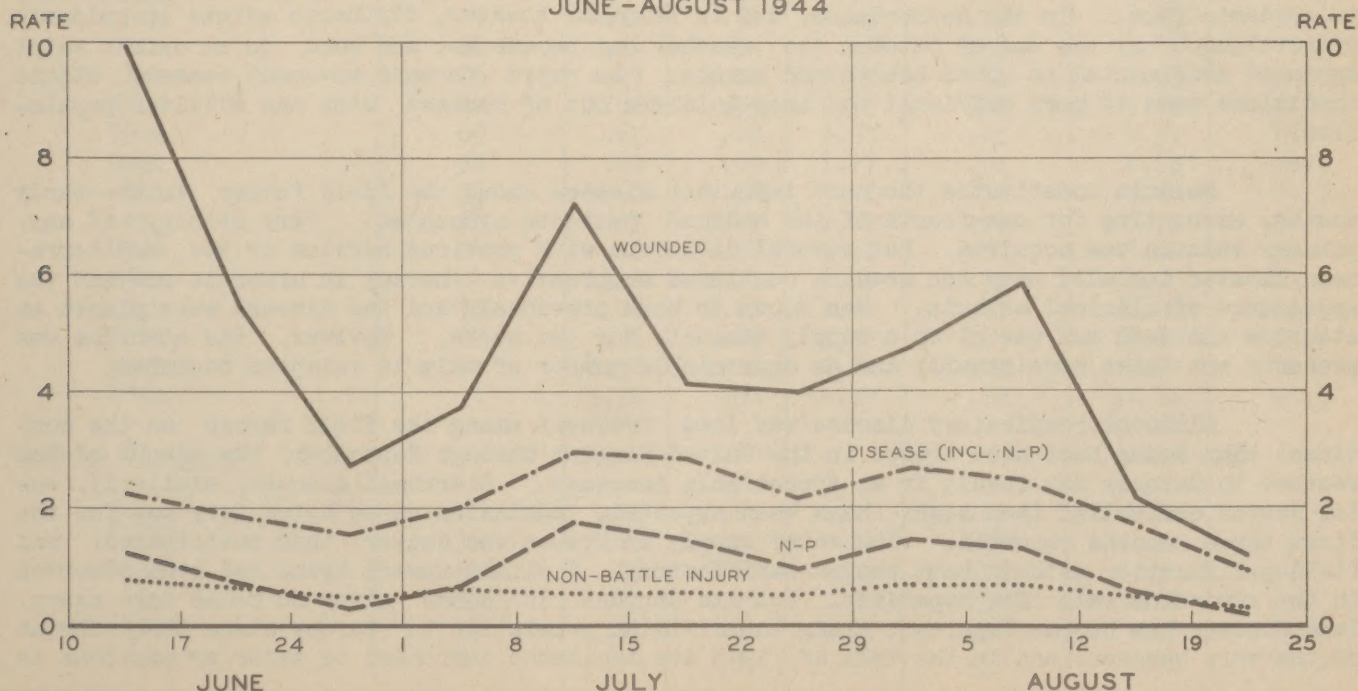
MEDICAL ASPECTS OF INVASION OF FRANCE

For sheer size and complexity the medical task imposed by the invasion of northern France, the Lowlands, and Germany has no parallel in the history of the Medical Department. There was reason to anticipate many more casualties than occurred, although the casualty rates to date are such as no large U. S. force has previously sustained during the war. Despite the penetration of heavily populated territory prostrated by two years of enemy occupation and pillage, the disease picture has been relatively favorable. No major threat of communicable disease has thus far emerged. Large numbers of wounded are receiving early first aid and surgical treatment of unprecedented quality and are being returned to duty at a satisfactory rate. Wound infection has been minimal. At the same time, and roughly in proportion to the incidence of battle casualties, the incidence of neuropsychiatric admissions is higher than on any other major front. Hospitalization and evacuation have proceeded satisfactorily, and at times with outstanding success, despite a prolonged phase of most rapid movement by armored columns of the Third Army.

Preliminary radio reports to The Adjutant General list 223,000 U. S. casualties through 31 October, 151,000 wounded, 31,000 killed, and 41,000 missing. Up to 30 September all the divisions on the continent had sustained casualties at an average rate of 4 wounded per 1,000 strength per calendar day, almost as high as the World War I rate for the Meuse-Argonne offensive alone. Except for casualties, statistical information on the campaign is not too complete. Perhaps the best information is that which gives the admission statistics for combat divisions by weeks from 17 June through 25 August. A consolidation of these reports appears below in graphic form. For the first time a U. S. campaign of some length was being waged under circumstances in which battle casualties equalled or outnumbered nonbattle casualties. On the average, 62 percent of all admissions were for battle casualties, 8 for nonbattle injury, and 30 for disease. The latter figure may be compared with 43 percent for Tunisia, 64 for Sicily, 68 percent for Italy, 81 for Buna-Gona, and 58 for Attu, to mention only a few operations. Even by the end of August the disease rate had not yet overtaken the admission rate for wounded in action, and among the noneffectives battle casualties have from the start greatly outnumbered disease patients. This is true not only of the combat divisions alone, but also of the entire First Army. By September the estimated noneffective rate from battle casualties had reached 38 per thousand strength for the entire theater, the highest point of the war for any theater.

All casualties including those of the initial assault wave received first aid virtually as they fell. During the early phase of the operation further supportive therapy and life-saving surgery were available on the LST's used to evacuate casualties to debarkation points in the U.K. There at ports and at selected beach sites field hospitals had been established for the care of those patients debarking from the LST's who required immediate surgical attention or further supportive therapy. All other cases were routed inland to

ADMISSIONS PER THOUSAND MEN PER DAY, COMBAT DIVISIONS, BY CAUSE
JUNE-AUGUST 1944



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MEDICAL ASPECTS OF INVASION OF FRANCE (Continued)

transit hospitals where they received whatever treatment was required prior to final evacuation to general hospitals in northern England. Air evacuation of casualties established on D+4 was widely used and made possible prompt initial surgery in the United Kingdom during the period when hospital installations had not yet been set up in France. Later, as evacuation and field hospitals were placed in operation on the beachheads, initial surgery was performed in Normandy. Two major facts stand out in the surgical record even at this early date. One is the low death rate among the wounded and the other the low incidence of wound infections. All echelons of surgical care shared the credit for these accomplishments. Prompt first aid including the control of hemorrhage and the administration of plasma saved many lives which would have been lost in previous wars. Surgery was and continues to be performed in field hospital platoons operating as far forward as the clearing station level. Casualties with such grave conditions as penetrating wounds of the abdomen and sucking wounds of the chest received life-saving surgery within a few hours of wounding. The fatality for abdominal wounds has been estimated at 21 percent for the month of June whereas the comparable World War I rate is twice as high. The liberal use of whole blood transfusions in forward installations has been made possible by the blood banks maintained in part by flying whole blood from the Continental United States directly to France. Ample quantities of sulfa drugs and penicillin have been available and freely used whenever indicated. The low incidence of infections in wounds of casualties routed to evacuation and general hospitals has fostered the development of secondary wound closure. This procedure accomplishes closure of wounds four to ten days following initial surgery when the threat of infection has passed. As a result, healing is hastened, scar tissue is minimized, and, consequently, an earlier return of wounded men to duty effected. Centers have been established in England as well as the Continental United States for the more specialized types of surgery in order to enable the wounded to reap the full benefits of modern surgical specialization. All available evidence points to the high quality and effectiveness of the surgical treatment rendered in this operation.

One of the most remarkable features of the European campaign up to the middle of October was the comparatively low incidence of sickness, but it cannot safely be assumed that the margin of advantage will last far into the winter months. The men of the invasion forces were in peak condition, and left base areas in the United Kingdom where the hazards to health had been extremely few. They had been thoroughly immunized against three of the communicable diseases which otherwise constituted a threat to their military effectiveness. Their forward movement facilitated the preservation of health, especially the avoidance of civilian contact and the by-passing of towns and cities. Nevertheless, they were in the field, living under combat conditions, and in an area which for two years had been under ruthless German occupation. Throughout war-torn Europe, and especially in the regions of German occupation, the incidence of disease has increased, especially for communicable disease such as dysentery, diphtheria, scarlet fever, infectious hepatitis, typhoid, tuberculosis, syphilis, and gonorrhea, with typhus and influenza remaining potential threats of vast importance. For the most part Army training and controls functioned satisfactorily in the early months of the operation, but no serious disease at any time threatened the civilian population of France in epidemic form. In the Netherlands, and in Belgium, however, diphtheria exists in epidemic proportions. By the end of October the weather had become wet and cold to an extent which appeared detrimental to both health and morale. As rapid forward movement ceased, static conditions made it more difficult to keep soldiers out of contact with the civilian population.

Malaria constituted the most important disease among the field forces in the early months, accounting for one-fourth of the medical patients evacuated. Very little, if any, primary malaria was acquired, but several divisions with previous service in the Mediterranean Theater included many men needing continued suppressive therapy in order to prevent the appearance of clinical malaria. Men known to have previously had the disease were placed on atabrine and each man was given a supply adequate for two weeks. However, the atabrine was probably not taken consistently and an appreciable number of malaria relapses occurred.

Although respiratory disease was less frequent among the field forces on the continent than among base area troops in the United Kingdom through September, the advent of bad weather in October may result in an appreciable increase. Diarrheal disease, similarly, was far better controlled than might have been expected, admission rates being very low for the first three months reported. The water supply in France was better than anticipated, and field purification methods have proven satisfactory. A slight upward trend had been observed in the admission rate for hepatitis, but its current incidence gives no cause for alarm. This disease has become important among the civilian population in Europe since the outbreak of the war, however, and in the fall of 1943 its incidence increased to major proportions in

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MEDICAL ASPECTS OF INVASION OF FRANCE (Continued)

Italy. With the advent of cold, wet weather followed by snow in early November, scattered cases of trench foot were being reported. In view of the size of the force, the weather, and the terrain, trench foot must be regarded as a potential danger of considerable magnitude. It will be recalled that in the last war the British lost heavily from trench foot in Flanders.

Venereal disease is a certain danger to troops in France, especially in base areas and under static conditions, but through August the reported incidence among troops on the Continent was relatively favorable. There is evidence of a sharp rise in venereal infections during September, however, with rates of 17, 27, and 47 admissions per 1,000 men per year being reported for the force on the Continent for the first three weeks of the month, and the rate may be expected to go much higher. Paris was being named as the place of contact by about 50 percent of those infected in spite of the fact that during this period Paris was presumably "off limits" to all military personnel save those stationed there. This foreshadows repetition of the experience of the German Army in Paris. The enemy had special houses of prostitution reserved for the use of his soldiers, and suffered venereal rates for the Paris garrison on the order of 125 cases per 1,000 men per year. Unless Paris brothels are effectively closed to our soldiers, the same experience may be confidently anticipated.

Among the more valuable features of the data on the combat divisions is the information they afford on the variation in the various admission rates for the 113 division-weeks reported. There is marked concentration of the admission rates for nonbattle causes and extreme variation in those for battle casualty, as may be seen from the accompanying chart. The average admission rates are 4.22 per thousand men per day for wounded in action, .91 for neuropsychiatric disease, 1.17 for other disease, and .52 for nonbattle injury. About 90

ADMISSIONS PER THOUSAND MEN PER DAY, COMBAT DIVISIONS, BY CAUSE
June through August 1944

| Division | Days Reported | Rates Per Thousand Men Per Day | | | | | N.P. as Percent of Wounded |
|--------------------------------|------------------|--------------------------------|-------|-------|---------------------|-------------------------|-------------------------------------|
| | | Disease | | | Nonbattle Injury | Wounded in Action | |
| | | N.P. | Other | Total | | | |
| <u>All Divisions</u> | | .91 | 1.17 | 2.07 | .52 | 4.22 | 21.6 |
| <u>101st Airborne Division</u> | 24 | .32 | .69 | 1.01 | .30 | 2.79 | 11.5 |
| <u>Infantry Divisions</u> | | | | | | | |
| <u>Total</u> | | 1.04 | 1.35 | 2.39 | .59 | 4.97 | 20.9 |
| 5th | 4 | .13 | .50 | .63 | .19 | .89 | 14.6 |
| 80th | 16 | .14 | .34 | .48 | .38 | 1.84 | 7.6 |
| 1st | 76 | .27 | 2.32 | 2.59 | .43 | 1.88 | 14.4 |
| 35th | 44 | 1.82 | .93 | 2.75 | .66 | 4.06 | 44.8 |
| 79th | 69 | .67 | .98 | 1.65 | .45 | 4.37 | 15.3 |
| 90th | 52 | .83 | .95 | 1.77 | .81 | 4.52 | 18.4 |
| 2nd | 33 | 1.65 | 1.36 | 3.01 | .79 | 5.68 | 29.0 |
| 4th | 78 | 1.27 | 1.43 | 2.70 | .99 | 5.77 | 22.0 |
| 83rd | 24 | .72 | .88 | 1.61 | .60 | 5.82 | 12.4 |
| 29th | 74 | 1.32 | 1.27 | 2.59 | .79 | 5.98 | 22.1 |
| 9th | 73 | .78 | 2.06 | 2.84 | .47 | 6.02 | 13.0 |
| 8th | 22 | .84 | .48 | 1.32 | .63 | 6.20 | 13.5 |
| 30th | 71 | 1.56 | 1.06 | 2.62 | .12 | 6.47 | 24.1 |
| 28th | 4 | 4.12 | .60 | 4.72 | .76 | 14.24 | 28.9 |
| <u>Armored Divisions</u> | | | | | | | |
| <u>Total</u> | | .52 | .60 | 1.11 | .29 | 1.84 | 28.3 |
| 7th | 12 | .02 | .02 | .04 | .03 | .30 | 6.7 |
| 2nd | 64 | .18 | .80 | .98 | .15 | .53 | 34.0 |
| 4th | 39 | .71 | .49 | 1.20 | .36 | 2.00 | 35.5 |
| 3rd | 58 | .91 | .64 | 1.55 | .34 | 3.45 | 26.4 |
| 6th | 24 | .44 | .39 | .82 | .59 | 2.05 | 21.5 |

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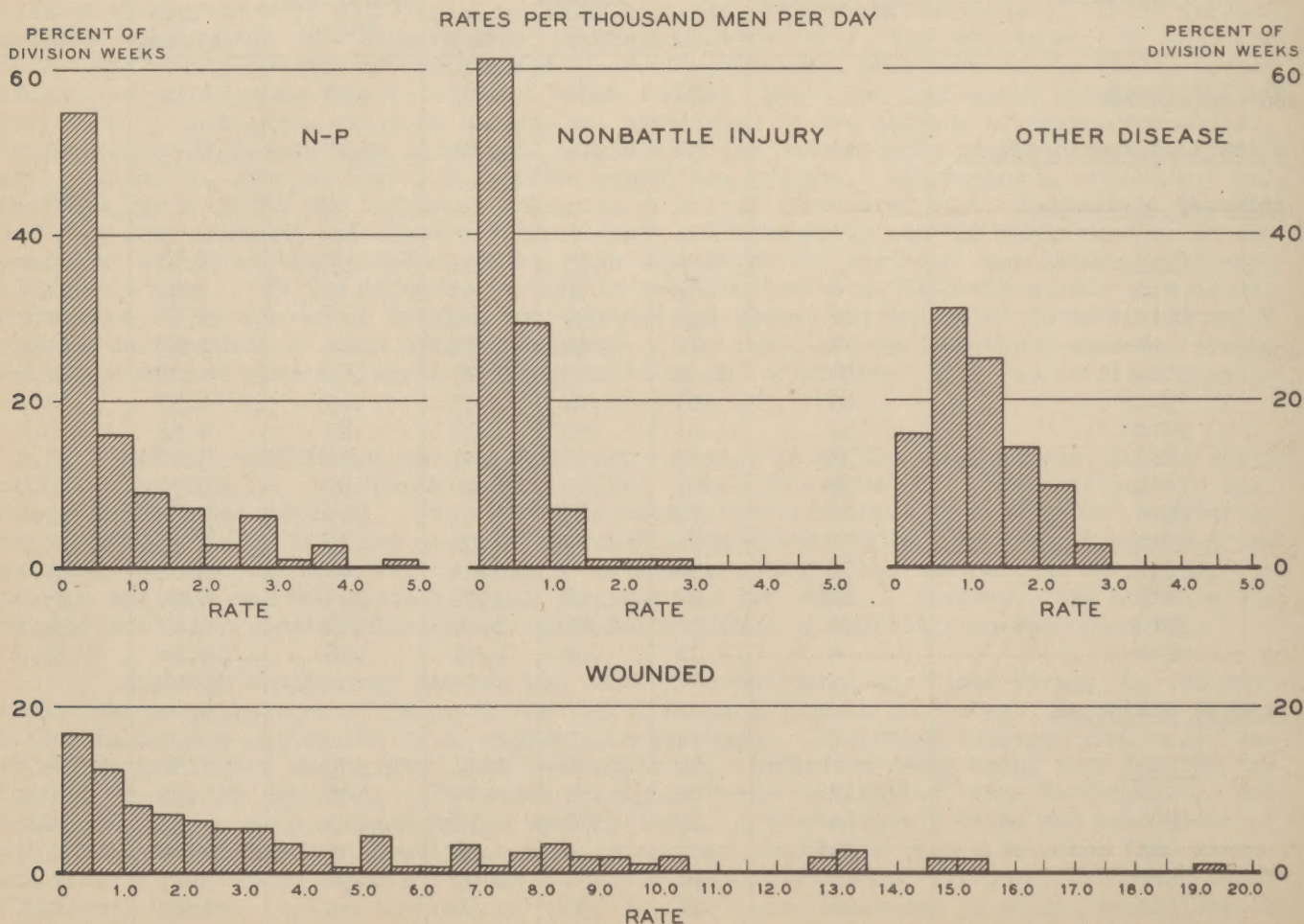
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MEDICAL ASPECTS OF INVASION OF FRANCE (Continued)

percent of the division-weeks entailed nonbattle injury admission rates of 1.0 or less, disease (other than neuropsychiatric) rates of 2.2 or less, neuropsychiatric rates of 2.5 or less, and battle casualty rates of 10.2 or less. The highest divisional battle casualty rate was 19.1 admissions per 1,000 men per day for the 4th Infantry Division during the week ending 16 June. The highest neuropsychiatric admission rate was 4.7 for the 29th Infantry Division for the week ending 4 August. The experience of the combat units on the continent has been unique among that of all other U. S. forces in this war with respect to the preponderance of battle casualty admissions over those for disease, and with respect to the admission rate for neuropsychiatric causes. Prior to this campaign the average neuropsychiatric admission rate for divisions engaged in intensive fighting had been about .7 per thousand men per day.

For each division the foregoing table gives the average admission rates for the reported period, by broad diagnostic groups. There is some suggestion of a relationship between battle casualty rates and nonbattle injury rates, and also between battle casualty and disease rates. However, there is a very marked correlation between battle casualty and neuropsychiatric admission rates, seen also in the generally parallel movement of the consolidated admission rates shown graphically on page 1. As becomes evident from an examination of the rates for any individual division, the underlying relationship is exceptionally close. It is, of course, well understood that the emotional stress of combat is conducive to combat exhaustion. The strength of the relationship varies considerably among divisions, presumably through the operation of many factors, leadership, selection of men, assignment of men, duration of previous combat, tactical situation, and the like. This type of variation illustrates the possibility of effective preventive work within the framework of the indubitably direct relationship between battle casualty and combat exhaustion. The experience of individual divisions appears on the following page in illustration of the marked dependence of neuropsychiatric admissions on combat activity. Similar data were published for several units of the Fifth Army in the February 1944 issue of HEALTH. The rates are plotted in index

DISTRIBUTION OF WEEKLY DIVISIONAL RATES FOR BATTLE AND NONBATTLE CAUSES



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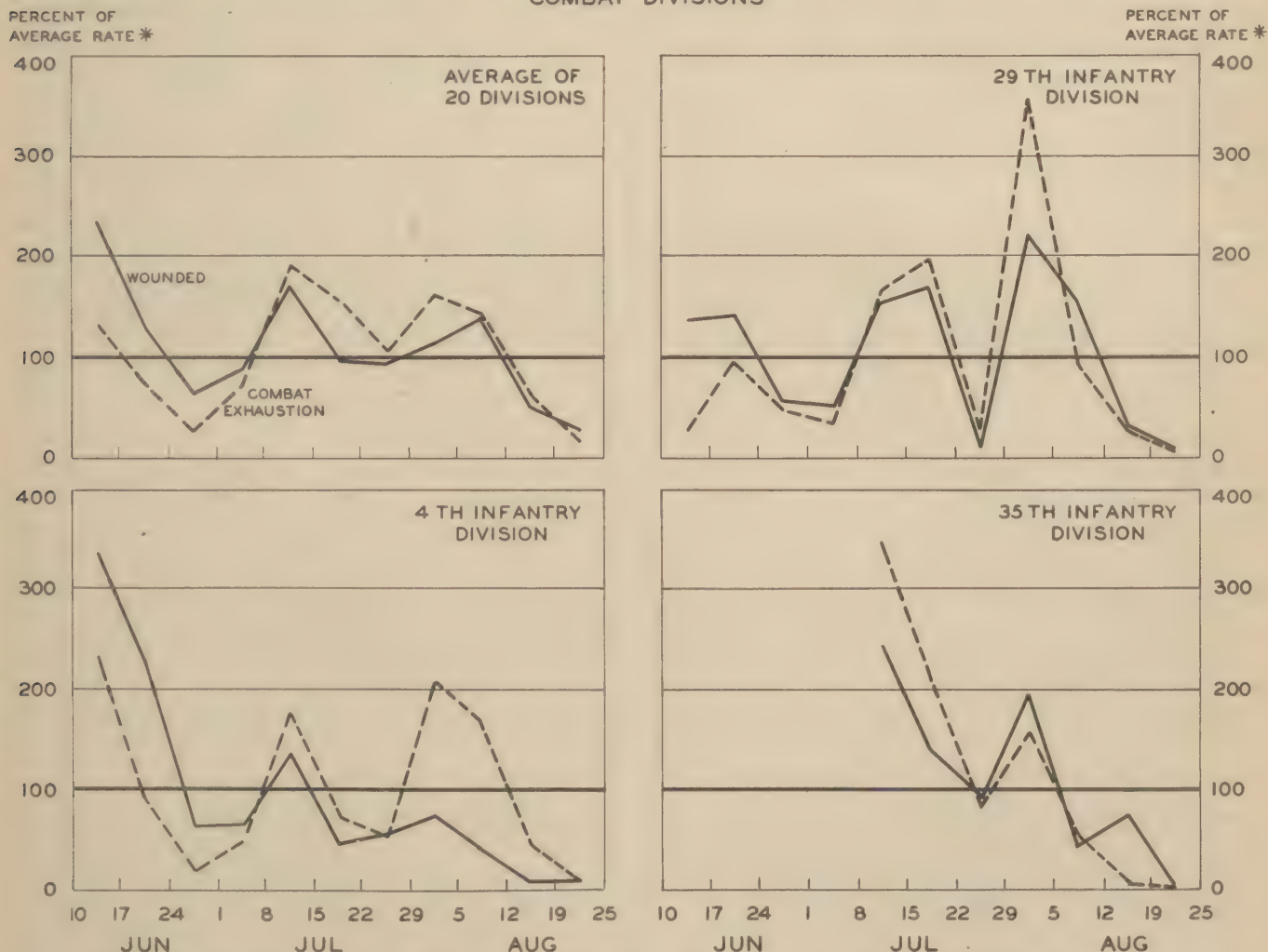
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MEDICAL ASPECTS OF INVASION OF FRANCE (Continued)

form, as percentages of their respective averages for the entire period, in order to follow their movement on a single scale. The 29th, 4th, and 35th Infantry divisions were selected as typical of the divisions of the First and Third Armies during the first three months on the continent.

During the first 60 days after D-day there were roughly 13,000 neuropsychiatric admissions, about 12 percent of all admissions in the First Army. One combat fatigue case appeared for each five wounded. There were almost no cases in the first few days, and then there is said to have been a wave of admissions on the part of men who were unfit for combat and who were then quickly weeded out. Thereafter, patients appeared more or less in response to the intensity of combat, or as divisions were used continuously in the line without rest. Many cases appeared among the men sent in to replace battle casualties, for these soldiers lacked support of the group feeling which comes with unit training and preparation for combat, and perhaps were not so well trained. Methods of triage and treatment found successful in the Mediterranean Theater have been applied on a much broader scale in the European Theater. Mild cases are treated forward of the clearing stations and returned to duty promptly after rest and sedation. More serious or prolonged cases are treated in the clearing stations. Twenty-nine percent of all First Army combat exhaustion cases admitted to clearing stations between D-day and 4 August were returned to duty, but the average for admissions to all echelons was 60 percent up to 14 August. It is expected that this percentage will go even higher, for it was not possible to dispose of patients to non-combat duty prior to 11 July. A large number of patients who would have been retained as limited service personnel were therefore evacuated to the United Kingdom during the first 35 days of activity on the

RELATION BETWEEN TREND OF COMBAT EXHAUSTION AND WOUNDED IN ACTION COMBAT DIVISIONS



*The average rate for wounded is 4.6 times that for combat exhaustion, but in each case the two curves have been scaled to the same dimensions by expressing them as percentages of their averages for the period.

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MEDICAL ASPECTS OF INVASION OF FRANCE (Continued)

continent. Two special combat exhaustion centers were established under the First Army to insure the return to duty of a high proportion of the more difficult or prolonged cases otherwise lost to the army by evacuation.

Casualties were evacuated from the continent by means of specially converted LST's, British hospital carriers, and returning aircraft. During the trip patients were classified as to their ability to withstand further evacuation, and upon debarkation admitted to "holding" or "transit" hospitals depending on their condition. From the "transit" hospitals patients were evacuated to general and station hospitals throughout the United Kingdom by hospital trains under the control of the Chief Surgeon. During June 27,000 patients were evacuated to "transit" hospitals in the United Kingdom, 6,000 nonbattle and 21,000 battle casualties. Of the total, 6,000 arrived by air and 21,000 by water. The air lift rapidly became a valuable adjunct to hospitalization on the continent. All during July a considerable number of casualties were evacuated from the forward units directly to the United Kingdom without definitive surgery in Army hospitals. The excellent lift guaranteed their arrival in the United Kingdom without undue delay. By 1 August there was enough hospitalization on the continent to provide primary surgery in field and evacuation hospitals for practically all the wounded.

Evacuation on the continent itself has been exceedingly difficult at times. Prior to the present stabilization of the front the armies advanced so rapidly that it was often impossible to evacuate patients except by air. The railhead was frequently 135 miles from Army evacuation hospitals because of destruction in lines of communication. The number of hospital trains has been inadequate because of the delay in opening a port and because of the state of the rolling stock on the continent. Vagaries of weather and tactical requirements have rendered air evacuation precarious. The need for some aircraft especially allocated to air evacuation was forcibly demonstrated at one point when all aircraft were employed on a tactical mission, with the result that 8,000 patients waited in holding units at various airfields. By the end of September, as the rate of advance slowed down, the evacuation process was operating more smoothly. At that time 128,500 U.S. patients had been evacuated to the United Kingdom, 65,900 by air. An additional 19,400 P.O.W. patients had been evacuated to the United Kingdom. The evacuation policy on the continent has been increased to 30 days, patients estimated to require a longer period of hospitalization being evacuated to the United Kingdom.

Hospitalization in the theater has thus far been more than adequate to handle the load imposed by the largest operation of the war. However, it is doubtful if the peak load had been reached by 5 October, when the WD authorization for fixed beds was reduced from 8 to 7 percent of strength. At the same time the theater evacuation policy was lowered from 180 to 120 days to permit more of the burden to be shifted to Z/I hospitals.

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DISEASE AND INJURY

WHOLE BLOOD NOW FLOWN TO THE EUROPEAN THEATER

During the past three months nearly 1,000 pints of whole blood, collected in the United States, have been flown each day to the European Theater. Blood collected from volunteer donors in this country is flown directly to France where it is transfused into recipients in field and evacuation hospitals. Since 21 August, when this program went into effect, over 45,000 pints have been made available for use in the European Theater. The need for whole blood transfusions in addition to plasma for the treatment of battle casualties has long been recognized by military surgeons. Its effectiveness for resuscitation of casualties in shock from excessive blood loss has been demonstrated in recent campaigns in Africa, Sicily, Italy, and France. Both plasma and whole blood have a definite place in the treatment of the wounded soldier. Plasma, by virtue of its long keeping qualities without deterioration and lack of need for refrigerated storage or typing prior to injection into the recipient, is the transfusion fluid of choice in division medical installations. The use of plasma in the battalion aid station and clearing company helps to make the casualty transportable from the division area to the hospital and preserves his life until he reaches the hospital. The use of whole blood, on the other hand, is essential in the field and evacuation hospitals to prepare the casualty to withstand life-saving surgical procedures. It has been shown repeatedly that traumatic shock seen in casualties in these hospitals is hemorrhage shock due primarily to the loss of whole blood. The cardinal treatment in this type of shock is the early replacement of this loss by whole blood.

To provide for the requirements for whole blood, the Chief Surgeon of the European Theater established a blood bank in the United Kingdom well in advance of D-Day so that an adequate quantity of blood could be supplied for projected military operations. The plan for a transfusion service included collecting teams, a processing unit, delivery teams, and sufficient equipment for these teams to carry out their assigned functions. This blood bank was completely dependent on military personnel as its only source of donors. The number of donors was quite adequate as long as the military population was concentrated relatively close to the blood bank, but as military personnel moved from the United Kingdom to the continent, the donor population was greatly reduced. As a result of the decrease in the donor panel and the increase in the demands for whole blood imposed by heavy fighting, it became apparent that the supply of blood would be insufficient to meet the daily requirements of the armies engaged in combat. In order to meet the increased requirements, the Chief Surgeon of the European Theater then asked The Surgeon General to supplement the supply of whole blood available in the theater with blood collected in the United States. The initial request for 1,000 pints of blood per day was received in the early part of August, and by 21 August blood was being flown in limited quantities to the theater. The bleeding of donors in this country and the shipment of blood by air 3,500 miles to another continent was an unprecedented program requiring special technique and equipment. Anticipating need for a program of this kind, representatives of the Army had already developed equipment and technique applicable for carrying out this function. Four blood collecting points were established in the American Red Cross Blood Donor Centers located in New York, Washington, Boston, and Brooklyn. These collecting points are staffed with Army and Navy personnel, with an Army or Navy Medical Officer in charge of each center. Donors are procured by the American Red Cross Blood Donor Service, and the blood is collected by Red Cross personnel. The selection of Group "O" donors, blood typing, cleaning and preparation of equipment, packing and refrigerating the blood for shipment is carried out by Army and Navy personnel. The transportation of blood by air to the European Theater of Operations is a function of the Air Transport Command. Only Group "O" blood is used in this program, primarily because it simplifies the use of transfusions. By observing certain precautions, Group "O" blood can be transfused safely into any recipient, without regard to specific type. Whole blood is collected into vacuum bottles containing a suitable preservative so that the blood can be used for as long as eighteen days after it is drawn. The blood container is so constructed that the blood is kept sterile at all times. A sterile administration set is provided with each bottle so that the blood can be injected immediately without preparing additional equipment. Thus, a transfusion of whole blood can be given with the same facility as a transfusion of plasma.

Improvements in technique and equipment for blood transfusions, in addition to advances in air transportation, have made it possible to supply adequate quantities of whole blood to field and evacuation hospitals in the combat zone. The proper use of blood and plasma in these installations has made better surgery possible and has contributed materially to the saving of life and limb. The excellent results which have been obtained with whole blood collected in this country and flown to the combat zone indicate the need for continuing this program, as well as for initiating similar programs in other theaters. A plan to supply blood from the west coast of the United States to the Pacific Ocean Area and the Southwest Pacific Theater is now under consideration. It is expected that, in the near future, a daily shipment of blood will be flown to Army and Navy medical installations throughout the Pacific.

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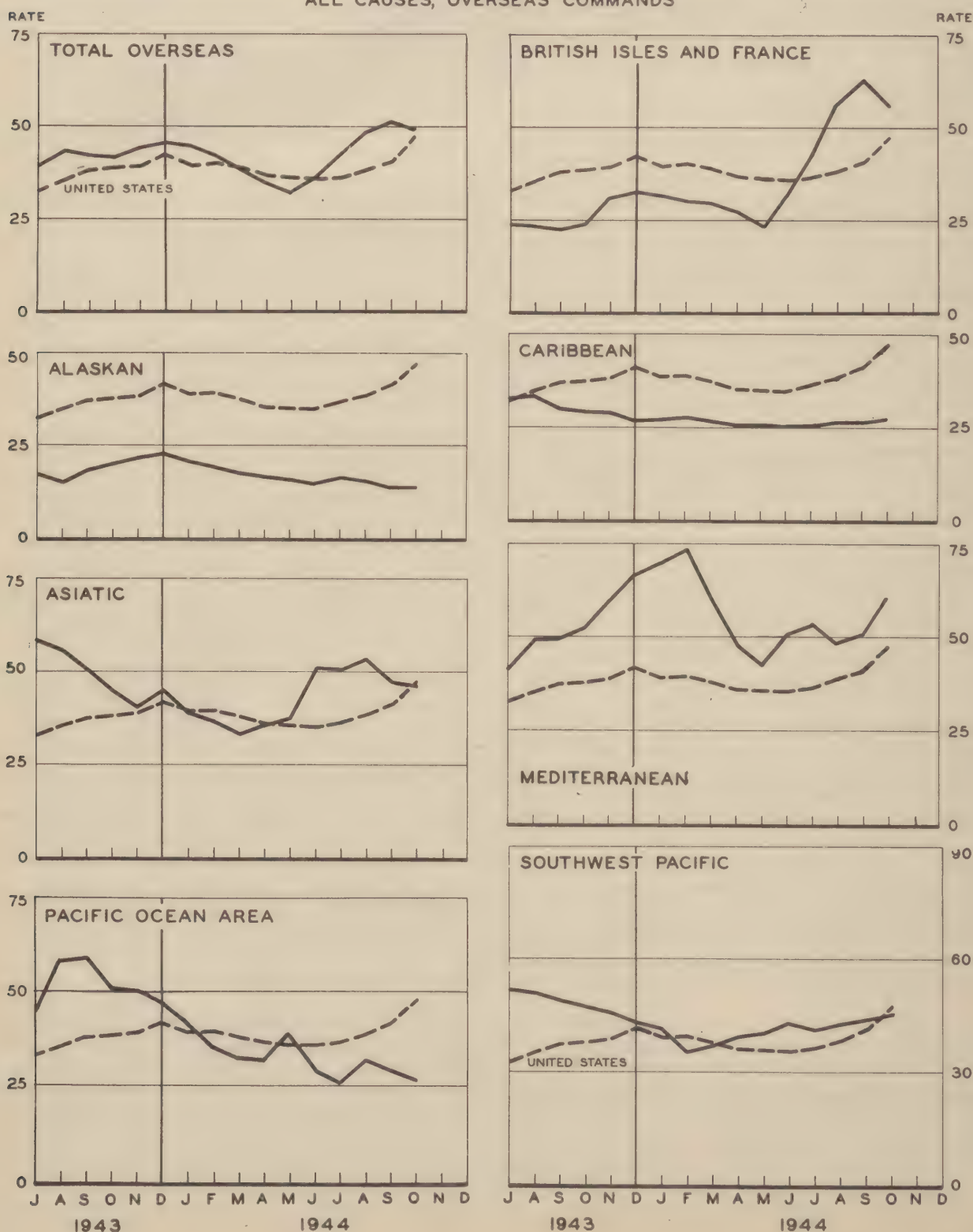
NONEFFECTIVE RATES, OVERSEAS THEATERS

During October there was a sharp increase in the total noneffective rate for the Mediterranean Theater (including the Seventh Army), and a significant decline in that for the European Theater, according to provisional estimates. The rate for the European Theater is especially tentative. The changes in other theaters were relatively slight, as may be seen from the panels below comparing each theater total with that for the U. S.

The panels on the following page subdivide the total noneffective rates shown below into their disease, injury, and battle casualty components. The 34 percent increase in the Mediterranean total rate is seen to derive from the fact that the estimated rate for the

AVERAGE NUMBER OF NONEFFECTIVES PER THOUSAND STRENGTH

ALL CAUSES, OVERSEAS COMMANDS



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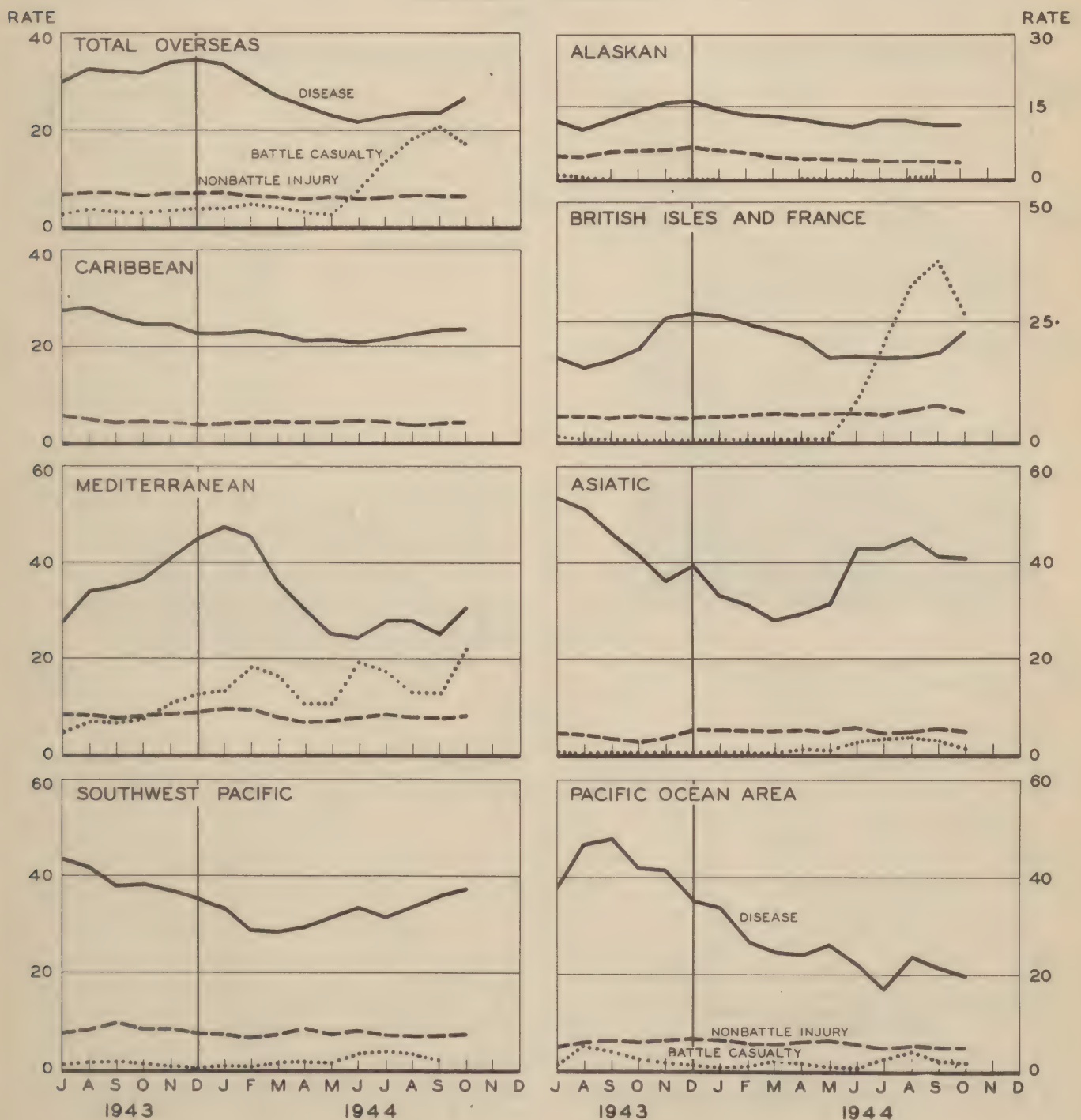
DISEASE AND INJURY

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NONEFFECTIVE RATES, OVERSEAS THEATERS (Continued)

battle casualty component almost doubled in response to increased activity of the Fifth and Seventh Armies. The nonbattle rates for the European Theater have been prepared without benefit of the usual reports from the theater and are thus merely indicative of the probable level of the components shown. The battle casualty element was estimated from radio casualty reports to The Adjutant General and from the World War I schedule of wounded patients remaining in hospital, which checks closely enough with Mediterranean and Southwest Pacific experience in this war. No reports have been received from the Southwest Pacific Area which would permit the showing of a battle casualty noneffective rate for October.

AVERAGE NUMBER OF NONEFFECTIVES PER THOUSAND STRENGTH OVERSEAS COMMANDS



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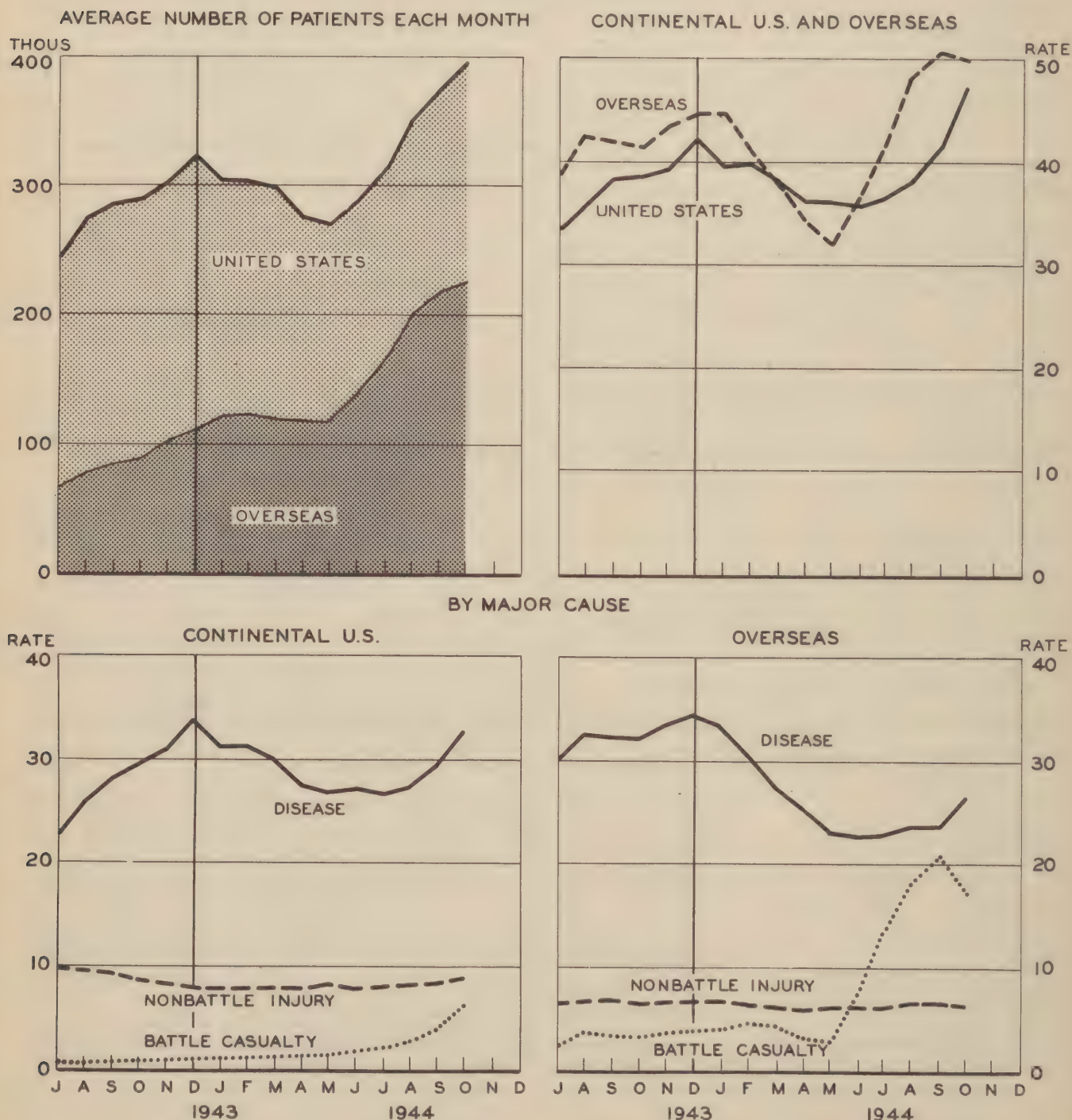
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DISEASE AND INJURY

NONEFFECTIVE RATES, U. S. AND OVERSEAS

Chiefly because of the estimated decline in the rate for the European Theater, the average number of noneffectives overseas during October failed to increase in proportion to strength, so that the provisional rate is slightly less than that for September. The U. S. noneffective rate, on the other hand, rose by 14 percent over the September level to reach 47.5 for October. The increasing number of evacuees caused most of the advance. In addition, the decline of about 200,000 in U. S. strength exerted some influence. Corrected for these two factors the U. S. rate is about 33 per 1,000 strength. The evacuees in hospital account for perhaps 12 points, and the change in strength for about two points in the estimate of 47 for October.

AVERAGE NUMBER OF NONEFFECTIVES PER THOUSAND STRENGTH ALL CAUSES



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DISEASE AND INJURY

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DISEASE, INJURY AND BATTLE CASUALTY

During October the admission rate for disease increased for troops in the Continental U. S. and for those overseas for the second successive month. The rise overseas is mainly attributable to increases in the European and Mediterranean theaters. The admission rates for disease continued to decline in all other theaters.

The increase in the battle casualty admission rate for October is entirely the result of an increase of activity in North Africa, both for the Seventh and Fifth Armies. No account has been taken of casualties sustained in the Philippines as no reports have been received which cover the first weeks of the operation.

All of the recent rates shown for the Army overseas are preliminary because it has been necessary to estimate the experience of the European Theater from incidental reports.

DISEASE, INJURY, AND BATTLE CASUALTY, ADMISSIONS PER THOUSAND MEN PER YEAR
ALL CAUSES



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DISEASE AND INJURY

PROBLEMS OF MEDICAL SERVICE AT ANZIO

Perhaps no operation of the war better illustrates the effect of the tactical situation upon medical service than the holding of the Anzio beachhead. Contained by the enemy within an area roughly 15 miles long and seven miles wide, a force of perhaps 50,000 to 100,000 British and American troops was raked by concentrated artillery and air attack for four months until the breakthrough in May. In this situation second and third echelon medical service was administered under the hazards and many of the difficulties usually associated with first echelon medical service. There was no rear. The main medical installations were located only six miles from the forward outposts, with supply dumps, an airstrip, and maintenance shops located on the edge of the medical area. The Germans could reach every part of the beachhead with their artillery and the frequency with which the corner occupied by the chief medical installations was hit led to its being called "Hell's Half Acre" by front-line troops. Combat soldiers openly expressed their anxiety at the prospect of evacuation to a beachhead hospital for treatment, preferring the "security" of their own front-line dugouts.

In the development of plans for the landing and for subsequent operations it was decided to provide medical installations with sufficient capacity to accommodate casualty rates up to 15 percent of the total strength committed to the operation during the first days of the action, and thereafter to accommodate daily admission rates of 5 per thousand per day from all causes. Control of medical units was decentralized to task and sub-task force surgeons to provide unlimited elasticity in their employment. The actual landing was accomplished under conditions of tactical surprise. Casualties on the landing, which had been estimated in advance at twelve percent of the initial assault waves, were actually only a fraction of one percent of the troops involved. The small number of casualties required less in the way of medical installations than planned and as a result some medical units lost their landing priority in favor of combat troops and material. The German command did not, as had been hoped, withdraw troops from the Liri Valley, but brought in fresh divisions from the north to liquidate or contain the beachhead force. By 2 February, it was apparent that no further penetration would be made of the German positions, and the attack gave way to preparation for a series of German counterattacks. Until the beginning of May, when the spring offensive started, the tactical situation was unchanged.

Three evacuation hospitals, the 56th, 95th, and 93rd, and the 33rd Field Hospital were moved to Anzio to provide hospitalization for U. S. Army casualties. The medical units on the beachhead were originally located in buildings selected by means of aerial photographs. However, as the result of the bombing and continued shelling of these buildings, they were forced to move under tentage set up in a field a short distance from the town of Anzio and about one and a quarter miles from the beach. Movement of the medical units outdoors complicated their drainage and sanitation problems. The beachhead was adjacent to the Pontine Marshes and the water level could be reached by digging through only a few feet of topsoil. Because of the prevailing dampness additional supply items were needed, fresh straw, more blankets, stoves, and clothing, and not merely for medical personnel, but particularly for patients suffering from shock or respiratory diseases. Foxholes or shelters soon became waterlogged. Toward the end of March the rains became less severe and it was possible to provide patients and staff with some measure of protection from enemy fire. Each tent was provided with a foundation, and the sides of the tents were fortified by walls of sand-bags. Patients were placed on cots entirely below the surface of the ground where they were safe from flying shell fragments if not from direct hits.

On 7 February, a German plane was attacked by a Spitfire over the hospital area. The enemy pilot, attempting to escape, jettisoned his bomb load over the area of the 95th evacuation hospital, crippling that installation. To insure the continuity of medical service on the beachhead, the 15th Evacuation Hospital was moved from the Cassino front as a replacement, and the staffs of the two hospitals were interchanged. On 10 February the area of the 33rd Station Hospital was hit by an entire 88 mm barrage, after which only one platoon was able to function in the role of evacuation hospital.

The presence of Army Nurses on the beachhead carried a significance which cannot be overestimated. They served as a ringing affirmation of a determination to hold what had been gained. In front-line actions the expression "Well, if the nurses can take it, so can we," was commonly heard. The determination of countless allied soldiers was strengthened by the knowledge that they stood as the only line of protection between the enemy and our medical installations on the beachhead. At one time the removal of all nurses was considered, but it was finally decided that they should stay. Their removal would have betrayed to the combat troops the gravity of their own plight. At all times there was complete unity of effort between British and American medical personnel. Many British casualties requiring neurosurgery were transferred to U. S. hospitals for that purpose. At the same time, whole blood was made available to both U. S. and British units through the efforts of a British Field Transfusion Unit.

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PROBLEMS OF MEDICAL SERVICE AT ANZIO (Continued)

Complete data are not yet available as to the volume of work done by the medical units on the beachhead. However, preliminary figures indicate that from the landing on 22 January until the beginning of the spring offensive on 22 May, a period of 122 days, 18,000 U. S. soldiers suffering from disease, 4,200 injury patients, and 11,000 battle casualties or 33,200 patients in all, received treatment in U. S. hospitals. The U. S. battle casualties are believed to have numbered 17,400, of which 2,300 were killed in action, 11,200 wounded, and 3,900 missing. The British suffered 14,000 battle casualties in the operation. Although detailed casualty statistics are not available for the operation as a whole, something is known of the experience of the 3rd Division. From 22 January to 28 March this Division, with a T/O strength of 15,500, sustained 5,300 casualties, or 34 percent of its strength. Over this period it endured a daily rate of 3.0 wounded per 1,000 T/O strength. Allowance for its actual strength would probably raise this to nearer 4.0, the average divisional rate for the European Theater.

The main medical problems on the beachhead were malaria, infectious hepatitis, and trenchfoot. The incidence of respiratory disease was not especially noteworthy. Information gathered in advance of the landing established the fact that 50 percent of the Italian troops once stationed in the Anzio district had contracted malaria, while an equally high incidence prevailed among the civilians who resided in the cities of Anzio and Nettuno. Incessant rains had flooded part of the low-lying land held by allied forces and in order to improve their defensive positions the Germans had blown up the system of dikes forming part of the drainage system of the Pontine Marshes. Continuous bombing and artillery fire had created new water basins or seepage pools, while water-logged fox holes and abandoned gun emplacements over the entire beachhead provided countless places where mosquitoes could breed. Combat and medical officers transformed every soldier on the beachhead into a malaria control unit. In addition to drainage of pools, streams, and bivouac areas, the dusting of pools even in no-man's-land was achieved by malaria control units. Atabrine was given by roster, and spray bombs were provided for front-line foxholes and dugouts. Night checks were frequently made to determine whether mosquito bars and headnets were being used whenever possible, and individual application of repellents was made a nightly drill. Fortunately, the breakthrough occurred before the season of transmission was fully under way.

During the entire period of the Anzio operation the incidence of hepatitis in the North African Theater was declining. However, from 29 January through 12 May the incidence among 3rd and 45th Infantry and 1st Armored Division troops on the beachhead was approximately 41, 19, and 19 admissions per thousand men per year, while for the 34th, 36th, and 88th Infantry Divisions on the main line the incidence was 41, 39, and 13 per thousand men per year. During this period the rate for the entire Fifth Army was approximately 22. Trench foot was a serious problem at Anzio as well as on the main line held by the Fifth Army. U.S. equipment was not satisfactory, and the men did not understand the necessity for special precautions in the care of their feet (see HEALTH for June 1944). Various studies indicated that lack of suitable equipment, lack of proper training in both the avoidance of unnecessary risk and in measures to minimize the effects of cold and dampness, and lack of supervision in individual foot hygiene were the basic military elements of the problem.

On D+12, control of medical establishments reverted to the 5th Army so that evacuation services between beachhead and base installations might be coordinated. The development of an evacuation system was directed toward the establishment of a seaborne route. Originally planned to last only a few days while beachhead forces were approaching the main body of the Fifth Army, this route was forced to serve throughout the period of four months. The shallow water at Anzio, continued German shelling and bombing of the port area, and uncertain weather conditions all complicated the evacuation procedures. No hospital ship could dock at the wharves, but all received their passengers by the intermediate employment of LCT's. High seas frequently interrupted this method of evacuation. At one phase, no hospital ships arrived for 14 days. Such interruptions affected the entire beachhead medical system. The units present maintained an emergency reserve of 900 beds in anticipation of periods when violent fighting would occur. When the means of evacuation were withdrawn, so that returns to duty and evacuations no longer balanced admissions, the existence of this reserve was jeopardized. Patients whose ailments were estimated to require more than two weeks of treatment were earmarked for evacuation. In addition to the regular hospital ships, LST's were employed at times to remove patients to base area hospitals. They would operate in any weather, were generally available, and during the first few months of operation they helped restore the balance between admissions and evacuations. During the period from 22 January to 22 May, 24,000 U. S. and 9,200 British patients were evacuated by sea from U. S. and British medical installations without injury or the loss of a single patient, despite the fact that the port area was under constant fire.

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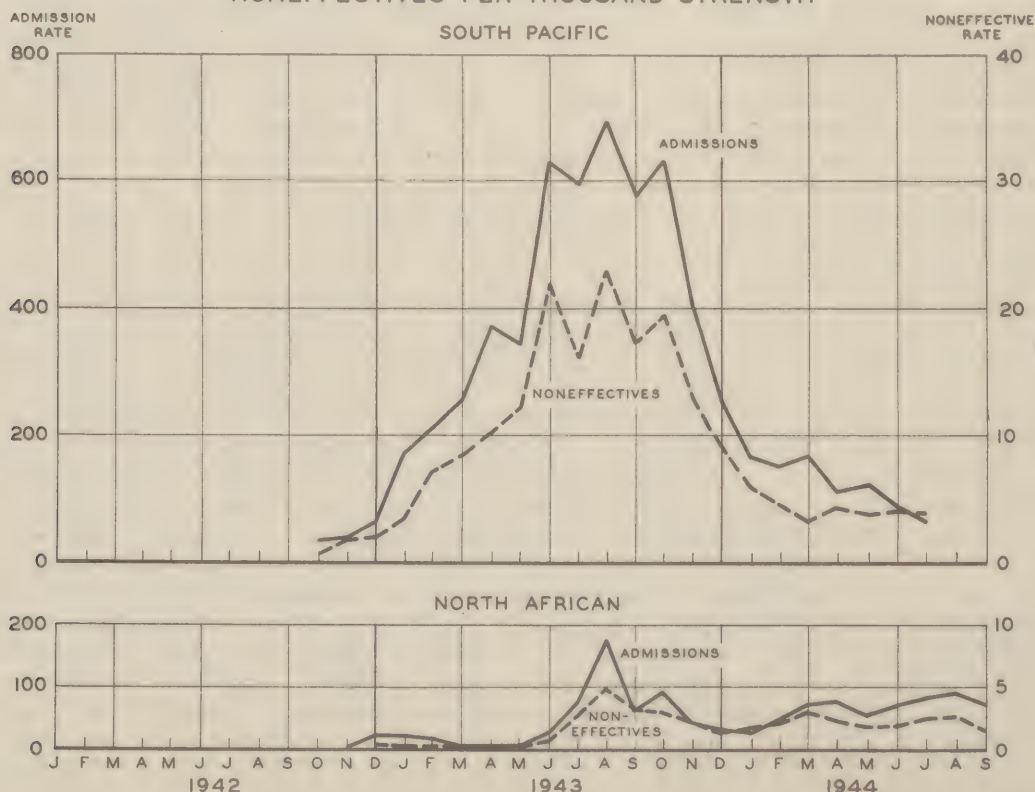
MALARIA

The recent malaria rates for the more malarious theaters are shown below and on the following page together with the rates for 1943 and the latter part of 1942. The lower rates for the current year in the two Pacific areas reflect primarily the better enforcement of atabrine discipline. In part, also, the reduction may be attributed to the increasing accumulation of troops in base areas which were formerly malarious combat zones and are now relatively well sanitized from the standpoint of malaria control. Nevertheless, special activities such as the staging of troops and advance into enemy occupied territory continue to be accompanied by immediate increases in incidence. These are of considerably greater magnitude than should be tolerated in the face of the overwhelming evidence that atabrine, when taken regularly, will effectively suppress the clinical symptoms of malaria although it will not prevent the infection.

The rise in the malaria rate for what is now the Mediterranean Theater during June, July, and August resulted from the training and staging of units of the Seventh Army in preparation for the amphibious landing in southern France. The enforcement of better atabrine discipline would have resulted in a much lower rate of clinical attack. It is not expected that the theater rate will again reach its level for August 1943.

Although the average rate for the Southwest Pacific Theater has declined steadily since its peak in February 1943, forward tactical movement along the northern New Guinea coast has been associated with increases in malaria as successive task forces invested Aitape, Hollandia, Wakde, Biak, and Noemfoor, in their drive toward the Philippines. During the month of July, the average rate for the entire theater was 52 admissions per thousand men per year. Except for the Lae area, which had a relatively high rate of 60, the base and staging area in eastern New Guinea and New Britain had rates well below the theater average. In the newly occupied zones, movement by amphibious landings into jungle country, the difficulties of general sanitary and malaria control in forward areas, and failure to enforce atabrine discipline, resulted in rates of 185 per thousand men per year at Aitape, 68 at Hollandia, and 108 in the Geelvink Bay Area (Biak, Noemfoor, Wakde, and Toem). The highest rate was recorded for troops on Noemfoor Island, there having been 329 admissions per thousand men per year during July. Although the rates for these forward areas declined in August as the tactical situation permitted the establishment of permanent bases, prolonged campaigns in areas of this type would carry a great danger of malaria in epidemic proportions unless effectively suppressed by atabrine. No reports have as yet been received for troops in the Philippines. The peacetime rates for Army elements stationed there provide no guide to in-

MALARIA, ADMISSIONS PER THOUSAND MEN PER YEAR, AND AVERAGE NONEFFECTIVES PER THOUSAND STRENGTH



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MALARIA (Continued)

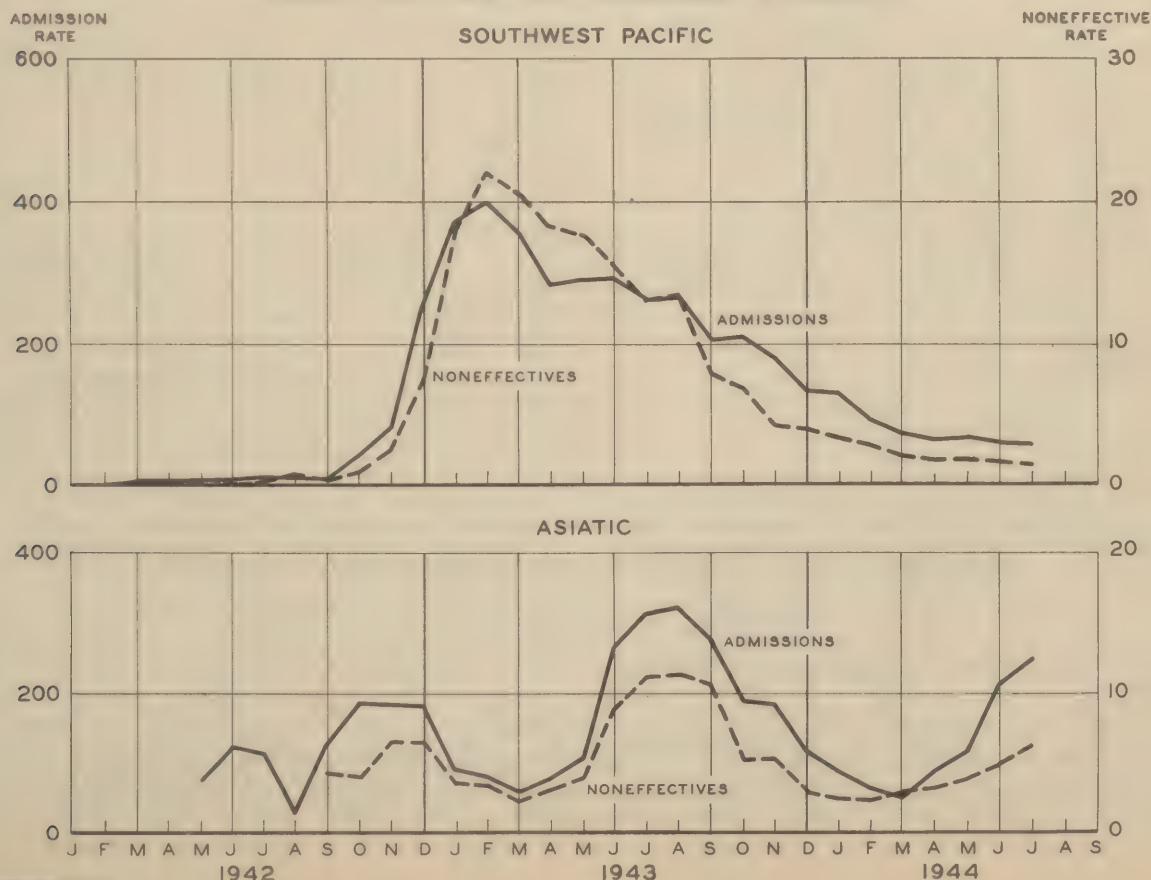
vasion conditions. In 1939 and 1940 the rates for white enlisted men in the Philippines were only 13.8 and 7.5 admissions per thousand men per year respectively. Following the Spanish American War, during the period of the Philippine Insurrection, rates for American troops were over 450 per thousand men per year, and fluctuated between 100 and 300 from 1904 to 1914. No official figures have been compiled for the 1942 Army catastrophe on Bataan, but unofficial reports suggest that up to 80 percent of the force was infected with malaria.

In the Asiatic Theater the approach of the southwest monsoon in May and June, and the monsoonal climate in July, accompanied by torrential rain, tropical heat, and high humidity, have again resulted in a seasonal increase in the activity of the malaria vector with resultant increase in the transmission of malaria. The July rate of 250 admissions per thousand men per year is twenty percent less than the corresponding rate for 1943. However, the experience of former years indicates that the peak may be expected later. The high rates in the Asiatic Theater during 1942 and 1943 may be accounted for in part by the fact that atabrine was not employed prior to April 1944, when it was administered to combat troops in Northern Burma. In this theater the absence of large-scale combat activity has been taken to contra-indicate the routine continued suppression of clinical malaria by means of atabrine, so that its admission rates have not fallen dramatically as have those of the South and Southwest Pacific. Improved mosquito control in the rear areas probably explains why the 1944 rates are more favorable than those for 1943.

Malaria admissions represented a much smaller proportion of all disease admissions in July 1944 for the Southwest and South Pacific than they did in July 1943. Last year the percentages were 27 and 33 for these theaters while for 1944 they are 7 and 8 percent respectively. However, 20 percent of all July admissions in the Asiatic Theater were for malaria, both this year and last. Similarly, in North Africa 8 percent of all disease admissions in July were for malaria in 1944 as well as in 1943.

The decline in noneffectiveness, while paralleling a similar movement in the admission rate, has resulted to some extent from improvements in methods of treatment. In the Southwest Pacific the average admission lost about 20 days in the early part of 1943, less toward the end of the year, and about 9 or 10 days during the first seven months of 1944. In the South Pacific the average patient admitted for malaria has lost 10 to 12 days per admission during the past two years.

MALARIA, ADMISSIONS PER THOUSAND MEN PER YEAR, AND AVERAGE NONEFFECTIVES PER THOUSAND STRENGTH



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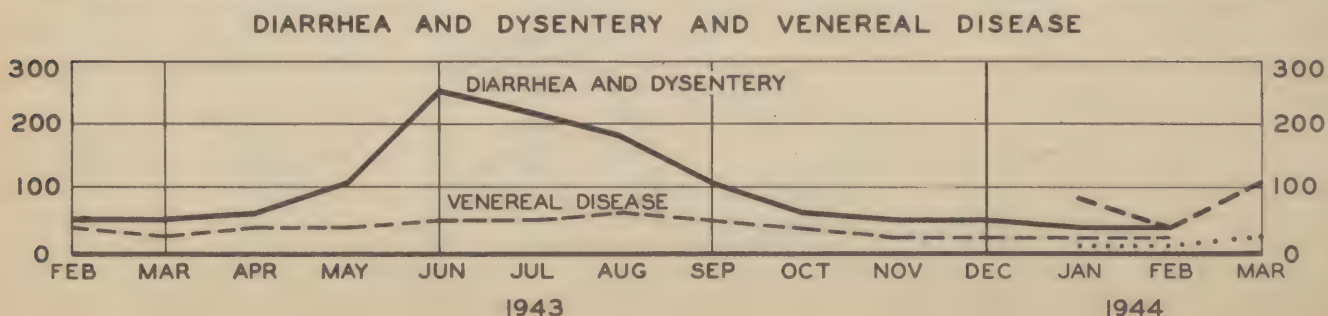
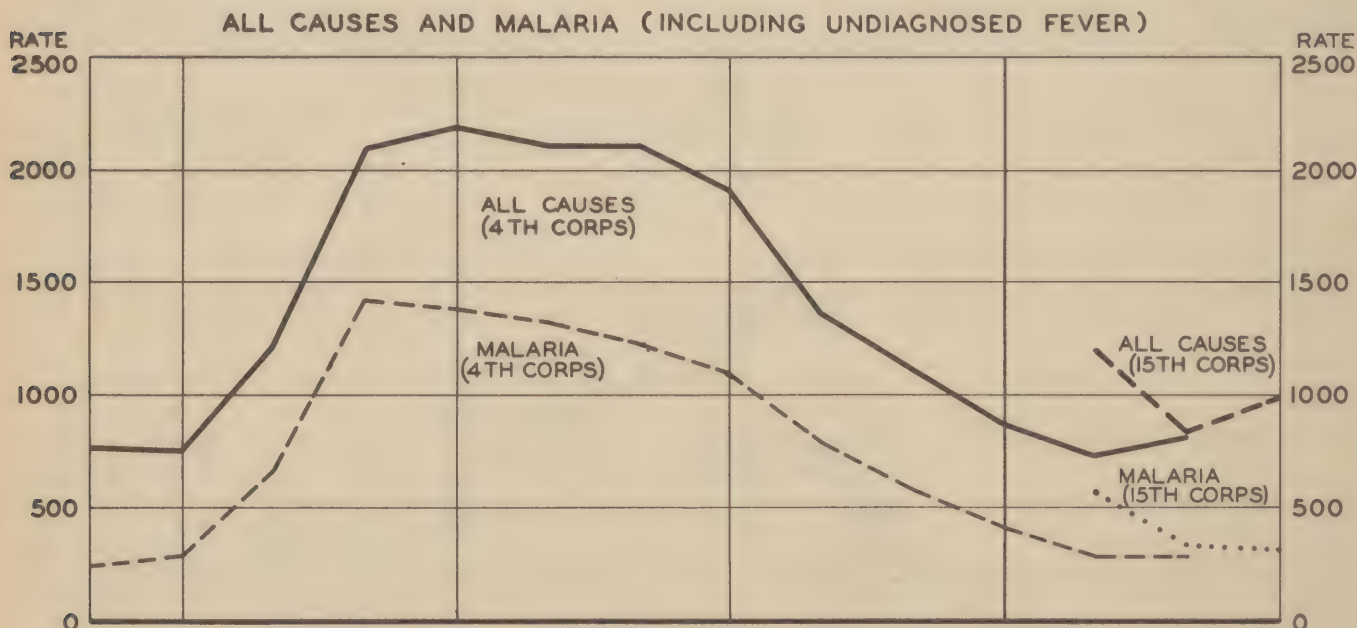
DISEASE AND INJURY

JUNGLE WARFARE IN BURMA

Japanese land forces will probably not receive their crippling blows on the Burma front, but more likely in the Philippines, Formosa, and eastern China. However, the experience in Burma of the British 14th Army and, to a lesser extent, that of the American and Chinese, testifies to the grave dangers to even large forces operating against the Japanese in malarious jungle areas in Asia. The American losses from malaria in the South and Southwest Pacific prior to the intensive use of atabrine provide a parallel in part, and one which should never again be repeated. The British experience in Burma is more recent and, except for malaria, more carefully studied than comparable U. S. combat experience against the Japanese. The British Burma campaign further serves as a proving-ground for forecasts of the hazards to be faced in comparable or similar areas by personnel under U. S. command, and as a means of re-evaluating plans for the control of the hazards thus revealed. The U. S. combat experience in Burma is valuable in itself, but much less extensive than the British which involved about 38,000 battle casualties (including 25,000 among Indian and colonial troops) in comparison with about 4,000 U. S. casualties from October 1943 to September 1944. The lessons of the British campaign in Burma are, however, confirmed in the brief U. S. operations thus far reported.

The operations of the Indian Army 4th Corps from February 1943 to the end of March 1944, and the 15th Corps from January through March 1944, have been analyzed with evident care and reported through British intelligence channels. The 4th Corps occupied the Central Burma front and was being pushed back during March by the Japanese who sought to invest Imphal, there having previously been little more than patrol clashes. The 15th Corps was engaged in defense of its supply lines to the Arakan and in extending its control east and south of Maungdaw. Indian troops made up about two-thirds of the total British forces in both corps. For the most part operations consisted of relatively small-scale encounters with an enemy greatly inferior numerically and on exceedingly difficult terrain. The divisions under the 4th Corps had a strength of approximately 70,000 troops, while that of the 15th Corps was nearer 100,000, line of communication and attached corps troops being excluded.

HOSPITAL ADMISSIONS PER THOUSAND MEN PER YEAR, BY CAUSE FORWARD DIVISIONS IN BRITISH BURMA, FEB 1943 - MAR 1944



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JUNGLE WARFARE IN BURMA (Continued)

Until March 1944 battle casualties accounted for less than 1 percent of all hospital admissions among the divisions under the 4th Corps, although nonbattle admissions were exceedingly high. A similar situation prevailed in the 15th Corps until active contact was made with the enemy early in 1944. Casualty statistics for the five divisions on the Arakan front from 22 January to 31 March list only 5,500 battle casualties of which 3,700 were wounded in action. Taken in relation to the elapsed time involved, the average divisional rate was roughly 1.0 per 1,000 men per day for all casualties and 0.7 for wounded in action, although one division sustained losses at twice these rates. Similarly, during March, when the Japanese were driving forward into the Manipur State and Assam, two divisions of the 4th Corps suffered casualties at the rate of 0.9 wounded per 1,000 men per day. The British analysis takes these rates as indicative of the level to be expected in future action under similar jungle conditions, but it seems possible that they might have been somewhat higher had the opposing forces been more evenly matched. That the rates are quite low in comparison with warfare on other fronts may be seen by comparison with such rates for wounded in action as 3.4 per 1,000 men per day for the Attu Campaign, 1.9 for the Admiralty Islands, 2.3 for Biak, 4.5 for Saipan (Army only), 1.4 for divisions in Italy from June to September 1944, and 4.0 for divisions in Europe during the first four months of the invasion (see HEALTH for September). There being no assurance that such statistics are gathered under uniform definitions as to what constitutes an admission for wounds received in action against the enemy, any such comparison must be considered approximate. It cannot be far wrong, however, for the British ratio of four wounded to one killed is similar to that of four or five to one reported for most U. S. operations. As would be expected, rates for the infantry components of the divisions were two to three times the average rates for all other arms and services within the divisions in the Burma campaign. Telegraphic information on the 85,000 Chinese troops under U. S. command in the Asiatic Theater suggests that the entire force sustained wounded at an average rate of about 0.4 per 1,000 men per day during the five months ending with October, but it is not known by how much this rate would be raised if it were based upon divisions in the combat area alone. Similarly, Merrill's Marauders, operating behind enemy lines for four months in Burma, had only 96 killed and 306 wounded in three battalions with a strength of perhaps 2,100 men, or an average rate of 1.2 wounded per 1,000 men per day. In more open country, affording opportunity for contact between fairly large bodies of troops, and the use of armor and artillery, casualties of an entirely different order must be anticipated. For example, the Italian campaign is probably a better guide to the casualties to be expected in the Philippines.

If the losses from battle casualties were low among the British divisions engaged in Burma in 1943 and 1944, the losses from nonbattle causes were extremely high. The accompanying chart gives hospital admission rates for divisions under the 4th Corps from February 1943 through February 1944, with comparative data for the 15th Corps during the first three months of 1944. The earlier experience of the 15th Corps is said to have been closely similar to that of the 4th Corps. The rates for British and Indian personnel were too much alike to warrant separate treatment. Since the chart covers only hospital admissions it is likely that a significant amount of sickness of lesser degree, usually included in analogous U. S. statistics, is thereby excluded. The parallel noneffective rates are not given by the source document, but a conservative allowance of three weeks lost per admission carries the implication of noneffective rates on the order of 120 per thousand strength during the summer peak. As is evident from the chart, the real problem was malaria, for even during the period of minimum sickness malaria accounted for over 50 percent of all nonbattle admissions to hospital. Burma is one of the most malarious regions of the world, and the forward areas in which these divisions operated were of course not sanitized like base areas. It is believed that 1942 rates in the area were even higher. The high relapse rate among troops exposed in highly malarious regions for only short periods accounts for the continuous importance of malaria throughout the year. As a matter of fact, only one or two brigades out of 60,000 troops were operating in the most malarious areas during the height of the transmission season. Had larger numbers of troops been thus exposed the rates would have been much higher. An interesting finding is that the admission rates for disease did not vary with tactical activity. This is contrary to average U. S. experience and suggests that a saturation point had been reached. It was also observed that personnel of poorer physical quality suffered much more heavily than those of superior physical quality.

Precise comparisons cannot be made with U. S. admission rates, which characteristically include admissions of lesser degrees of illness, and seldom provide systematic coverage of forces in the field. During the early months of 1943 the rates for all U. S. forces in New Guinea probably were of the same order as the British rates in Burma, if allowance is made for undiagnosed fever. Similarly, the Japanese forces in the Rabaul area at that time probably had even higher rates. Individual U. S. divisions, notably the Americal and the

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DISEASE AND INJURY

JUNGLE WARFARE IN BURMA (Continued)

25th Infantry Divisions, have suffered more heavily from malaria (see HEALTH for December 1943 and May 1944) but under more severe tactical conditions and before the suppressive value of atabrine had been properly appreciated. Because of careful anti-mosquito work and more rigorous use of atabrine, the current U. S. malaria experience is in marked contrast to that of the early period in the Pacific, but the British data serve as a reminder that the problem is by no means solved for the future. Malaria must be continually and zealously fought now and in the future if operations are to be successfully prosecuted in such areas. The current malaria rates (including undiagnosed fever) for all troops in the Asiatic theaters, largely confined to base areas, are on the order of 300 to 500, about a third of the British rates for forward areas. Although one Marauder battalion was heavily seeded with malaria acquired in the Pacific, atabrine made it possible for this battalion to operate as effectively as the previously malaria-free battalions. The British analysis of the Burma campaign reveals that suppressive therapy was not effectively employed, and that anti-mosquito discipline was inadequately maintained, especially along the lines of communication. Although the admission rates were lower for officers than for enlisted men, a certain degree of ignorance about the essential principles of anti-malaria work was observed among officers especially in regard to the siting of camps in relation to native villages, terrain, and the like.

The two other disease-groups shown in detail are the diarrheal and the venereal diseases. With hospital admission rates for diarrhea and dysentery of the order shown in the chart it is probable that a large proportion of the fighting strength of the British divisions was operating at reduced effectiveness. No U. S. divisional rates are available for comparison, but entire theaters have had average admission rates of this order or even higher, especially the Mediterranean during the summer of 1943 and the Middle East early in 1943. Current admission rates to hospital and quarters for U. S. troops throughout the Asiatic theaters are about as high as the British hospital admission rates. The Marauders suffered very heavily from amoebic dysentery during the early months of 1944, although there were comparatively few evacuated until the Myitkyina airfield was taken, when the chronically ill were brought out by air. By that time the regiment was saturated with amoebiasis. The British analysis attributes the high incidence of diarrheal disease in Burma to poor water discipline and lack of adequate equipment at fixed installations. Some officers evinced little appreciation for the importance of water discipline. It was also noted that too few individual water sterilization outfits had arrived in the forward areas to discourage further the consumption of contaminated water. The Marauders were supplied with Halazone tablets which were used, but it was not known that Halazone is effective against the amoebic cysts as well as bacteria after 30 minutes of treatment. Boiled water could seldom be supplied. Venereal diseases constituted a less serious problem to the British forces in Burma than among all forces in India during 1941, evidently because of lessened exposure. However, the hospital admission rate reached 61 at one point, about the average for U. S. forces in the Asiatic theaters. The Marauders are said to have had no venereal disease in Burma. Although it did not trouble the British early in 1944, scrub typhus proved to be of considerable military importance to the U. S. and Chinese troops in Northern Burma (see HEALTH for August) who were without protective clothing. Control of this serious disease requires impregnated clothing except in areas cleared of the scrub and grass which harbor the mite vector. The Marauders had comparatively few neuropsychiatric cases in Burma, probably because of the careful weeding-out which preceded the foray into the jungle, potential cases having been given non-combat assignments in a rear echelon. This selection also operated to minimize the need for evacuation of patients by the unit while it operated behind enemy lines.

The British Burma campaign data were utilized for deriving attrition or wastage rates for operations of this type. Analysis of unit and hospital records revealed that most patients requiring three or more months of hospitalization never returned to their units and thus constituted wastage to the forward divisions. The theater wastage was less, of course, as some of the patients undoubtedly were reassigned elsewhere. For nonbattle admissions during the period under review it was discovered that about one in six British officers and enlisted men, and one in three Indian enlisted men was permanently lost to his organization. About 50 percent of the wounded were also found to constitute wastage. Observations on the Fifth Army (see HEALTH for September) suggest that U. S. losses to combat divisions in Italy may be at least as high as these proportions of admissions, or possibly higher. The British found that the losses to front-line units increased the farther back their patients went in the chain of evacuation. When hospital facilities were located in close proximity to a unit, nearly all patients returned within several weeks of admission, especially if they were returned to their units directly without going through a reinforcement camp. Men requiring more than three months of hospitalization, and evacuated to base area hospitals, were usually written off by unit commanders as lost. The British opinion is expressed that the proportion

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JUNGLE WARFARE IN BURMA (Continued)

of hospital admissions lost to their units was perhaps twice as great as medical necessity dictated. The recommendation was made that a card system be instituted whereby units would know the status and location of their personnel. The manpower loss entailed by failing to return individually trained men to their own units is given great emphasis. The British expected the introduction of Forward Malaria Treatment Units to reduce length of hospitalization as well as to increase the proportions returning to duty.

The estimates of net wastage to divisions of the 4th Corps and 15th Corps forward of their lines of communication are summarized below in tabular form. The battle attrition

PERCENT OF DIVISION STRENGTH LOST PER MONTH*, BY TYPE OF WASTAGE

| Personnel | Nonbattle Attrition | | | Battle Attrition Intense Activity | | Repatriation |
|------------------|---------------------|---------|----------------|-----------------------------------|------------|--------------|
| | May-Oct | Nov-Apr | Yearly Average | Infantry | Other Arms | |
| British Officers | (1.33 | (0.67 | (1.0 | 8.4 | 2.5 | 1.0 |
| Indian Officers | (| (| (| 8.8 | 3.6 | - |
| British Enlisted | 2.75 | 1.25 | 2.0 | 4.5 | 2.2 | 1.0 |
| Indian Enlisted | 5.50 | 2.50 | 4.0 | 4.3 | 1.9 | - |

* Thirty days.

is not stated in terms of calendar time, but of 30 day periods of "intense activity", other periods being called "quiet". Three degrees of contact with the enemy were recognized and weights assigned to divisions according to the proportion of time their components had spent in combat of varying degrees. On the average, for the 15th Corps during January, February, and March, 30 days of intense activity represents 51 days after arrival in the combat area. Hence the battle attrition rates of the table may be roughly adjusted to calendar time of contact with the enemy by multiplication by 0.6. Repatriation applies only to British personnel. As previously noted, there was observed no difference between quiet and intense periods with respect to the incidence of disease, so that the nonbattle attrition schedule is applicable to any period.

The most important conclusion of the British analysis of the Burma operations is that wastage from sickness was excessive in forward formations and that it could be greatly reduced. The possibility of reduction in malaria wastage has been amply demonstrated by U.S. combat divisions in the Pacific, but not under combat conditions as intense and prolonged as those to be expected in the Philippines and deeper in Japanese-dominated areas. Scientifically the means are available, but their military success rests on the discipline enforced by command. The control of diarrheal disease and scrub typhus is entirely analogous. The major dangers are thus familiar ones against which weapons have been provided. If their use is properly enforced by command further jungle warfare in Asia need not involve the tremendous wastage seen in the previous operations of both British and U. S. forces in Burma.

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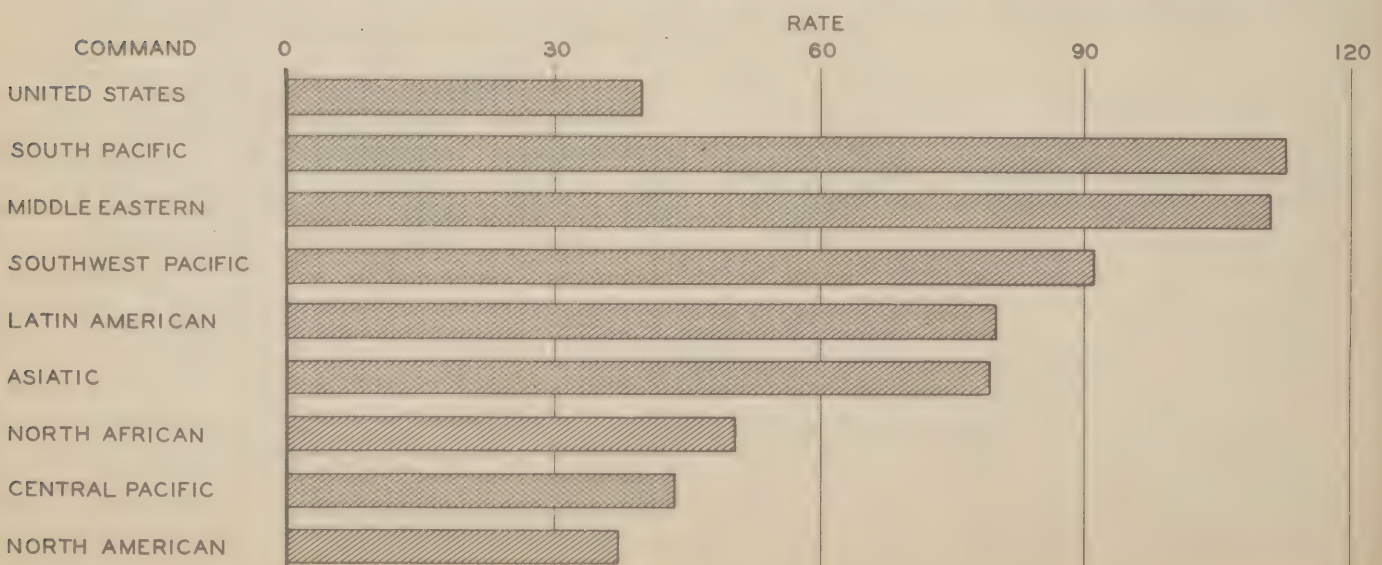
DISEASE AND INJURY

SKIN DISEASE

The more dramatic and better reported communicable diseases and psychiatric disorders have until recently effectively diverted attention from the importance of skin diseases among troops in tropical areas overseas. The first medical reports from Guadalcanal and New Guinea spoke of the frequency of skin disease, of the development of ulcerated conditions following bites and scratches, and of the slow rate at which wounds sometimes seemed to heal. Troubling as these symptoms were, they were far overshadowed by other medical problems, especially malaria and other epidemic diseases. The toll of skin disease in the Southwest Pacific particularly is now being documented, and considerable attention is being given to a troublesome variety of skin disease having some resemblance to lichen planus. Both in the U. S. and overseas there are special investigations under way which may offer better means of controlling and treating at least some of the skin diseases most responsible for the present high admission rates. However, disorders of this type are notorious for their intractability and there is no basis for optimism at the present time. Some relief may be afforded by the transfer of large bodies of troops from the Pacific areas of former activity in the direction of the Asiatic mainland, but it seems just as likely that the problem of skin disease should continue to be severe as strength is shifted north and west. Although similar to the skin infections found in temperate climates, the incidence, extent, and severity of skin diseases in the tropics are much greater because of the increased humidity, excessive perspiration, frequent wetting of the clothing and the feet, and oftentimes inadequate laundry facilities in forward areas.

Before the present war skin diseases occurred in the Army at the rate of about 35 to 45 admissions per thousand men per year, or five to seven percent of all admissions. As a cause of death or discharge they were virtually negligible but they contributed perhaps four or five percent of the noneffectiveness in the Army. Among troops in Panama, the Philippines, and Puerto Rico the incidence was somewhat higher, perhaps on the order of 50 admissions per thousand strength per year, if one may judge from the 1939 experience. The average case lost ten to twelve days. For the three years 1939-1941 in the entire Army the average noneffective rate because of skin disease was 1.85 per thousand strength, compared with 4.88 for injuries, 4.23 for colds and influenza, 2.70 for venereal disease, .71 for diarrhea and dysentery, and .55 for pneumonia. The war has made little or no change in the relative importance of skin disease among troops stationed in the U. S. In 1942 the rate for all forms of skin disease rose above its accustomed level to about 50 but in 1943 it was back to 40 per thousand men per year. The differential diagnosis of skin disorders being highly difficult, it is not surprising that the most common designation was a miscellaneous category embracing many different conditions, with the various fungus infections, boils and carbuncles, contact dermatitis, ingrowing nails, and scabies named in that order. Approximately three percent of all 1943 U. S. admissions for skin diseases were discharged, but a fifth of these had been admitted because of disabling scars. Although certain of the less frequent diagnoses involved losses of 50 days or more per case, the average case lost 11 days in 1942 and 13 days in 1943. More than two million man-days were lost by white enlisted men in the U. S. during 1943 because of skin diseases of all kinds, an average of 6,000 men each day of the year.

SKIN DISEASE. ADMISSIONS PER THOUSAND MEN PER YEAR, 1943*



* Overseas rates based on first nine months.

DISEASE AND INJURY

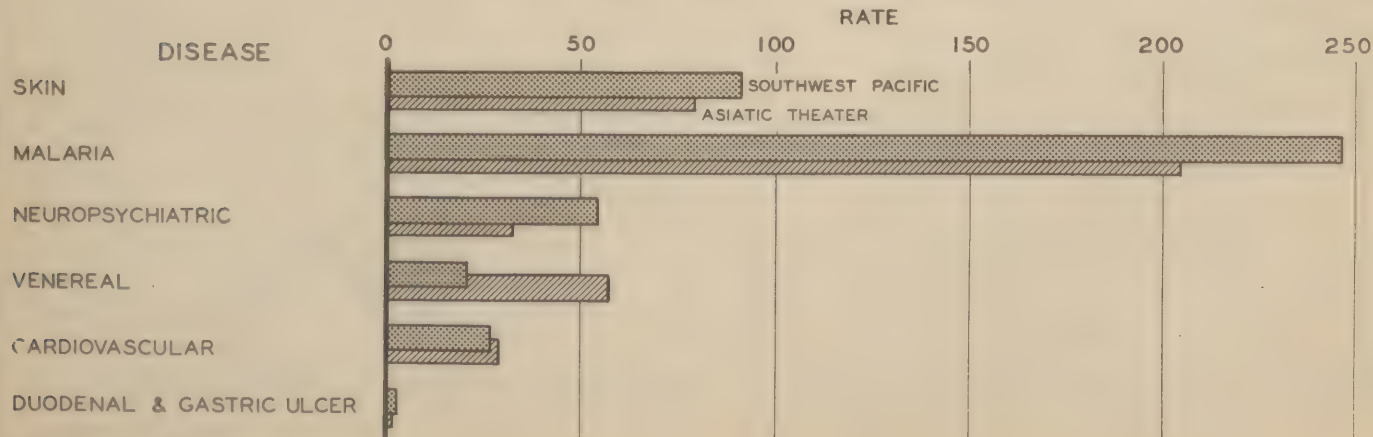
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SKIN DISEASE (Continued)

Statistical evidence is not yet in hand with which to describe in detail the process by which skin diseases came to occupy a prominent place among medical causes of non-effectiveness in the Southwest Pacific, but it may be presumed that the movement of troops northward from bases in Australia and New Caledonia exposed ever-increasing numbers of men to a considerably higher risk. For example, the 1942 admission rate for the Southwest Pacific was 68, but the rate for 1943 is estimated at 91 admissions per thousand men per year, more than twice the average U. S. rate. The marked variation among theaters and other major commands is evident from the accompanying chart, which gives preliminary 1943 rates for each theater, based on the first nine months of the year. The highest rates are found in the South Pacific, the Middle East, the Southwest Pacific, and the Asiatic Theater, although Latin America is not far behind. Comparison of the statistically large categories reveals a somewhat greater proportion of fungus infections of various kinds in the tropical overseas theaters, but the leading diagnoses are the same as those in the U. S., suggesting a generalized increase in all major types of skin disorder rather than the presence of distinctive diseases of major statistical importance in the tropical areas. This conclusion may not be entirely sound, however, because of the miscellaneous nature of some of the diagnoses and also because of the difficulty in assigning correct diagnoses to the myriad forms of skin disorder presenting themselves to the clinician for treatment. Rates of the order shown in the chart are considerably higher than those expected for venereal disease, although this is not necessarily true of particular theaters. Assuming 12 days lost per case, the Southwest Pacific admission rate connotes a noneffective rate of 3.0 per thousand men per day. For a theater of 700,000 this means a continual drain of about 2,100 men. This estimate is doubtless conservative, for there is reason to believe that more serious diseases may have been encountered in 1943 and 1944 which would have the effect of increasing the average days lost per case. The chart below compares skin diseases with other diseases and disease groups from the standpoint of relative admission rates in the Southwest Pacific and in the Asiatic Theater during 1943.

Listing the statistically most frequent diagnoses may give the impression that the skin diseases are trivial. The fact that the average case loses perhaps 12 days or more from duty, however, testifies to the contrary. Moreover, skin disease has become a significant cause of evacuation from overseas theaters. Tabulations of the special medical reports made on evacuees shortly after debarkation were prepared for the period November 1943 through June 1944. During that interval approximately 1,600 patients were debarked in the U. S. with skin disease as the primary diagnosis. Perhaps as many as 2,400 had skin disorder as either the primary or the secondary diagnosis. These figures represent 2.2 percent and 3.4 percent of all evacuees received during the period. Largely because of increased evacuation from the South and Southwest Pacific the trend of evacuation for skin disease has been definitely upward during the past year. In April, May, and June 345 patients having skin disease as their major complaint were debarked in the U. S. from the Southwest Pacific alone, and in July the theater reports having sent 445 patients of this type to the U. S., 17 percent of all its evacuees. During the eight months ending June 1944 about six percent of the evacuees from that theater were primarily skin disease patients, and about eight percent had skin disease as either a primary or secondary diagnosis. During 1943 only three percent of the evacuees from the Southwest Pacific were skin disease patients. In many quarters it is felt that the problem is one of increasing magnitude.

SELECTED DISEASES, ADMISSIONS PER THOUSAND MEN PER YEAR
SOUTHWEST PACIFIC AND ASIATIC THEATERS 1943*



*First nine months.

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DISEASE AND INJURY

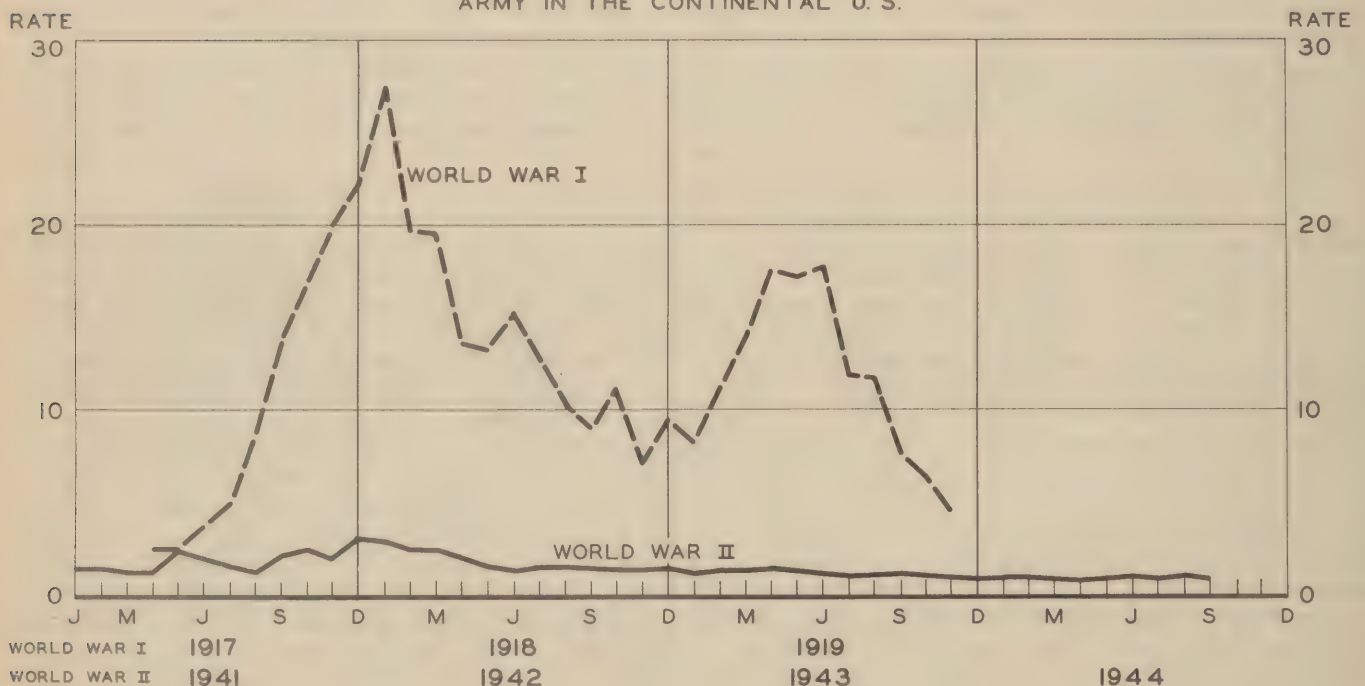
TUBERCULOSIS IN THE ARMY

Approximately 150,000 men have been rejected at armed forces induction stations because of pulmonary tuberculosis. This fact, more than any other, explains why the Army has been able to maintain a phenomenally low admission rate for tuberculosis. The chart below gives the rejection rates for pulmonary tuberculosis among selectees examined at induction stations. The rates do not take into account the rejections of 1 or 2 per thousand men examined by local boards, which preceded those at induction stations, and exclude perhaps 10 or 15 percent with disqualifying defects more serious than tuberculosis. The high rejection rate for 1942 represents the increased use of roentgenography in the induction stations, and high standards for acceptance, many men being rejected for calcified primary tuberculous lesions which later ceased to be disqualifying. The decline in the rejection rate during the latter part of 1942 may be attributed to the liberalization of Army standards, permitting acceptance of men with large healed primary lesions, a liberalization put in effect with certain specified safeguards. The sharp drop early in 1943 reflects a notable lowering of the average age of men called for examination, as is indicated by the fact that in the early months of 1943, as a result of the new legislation, about 40 percent of the selectees exam-

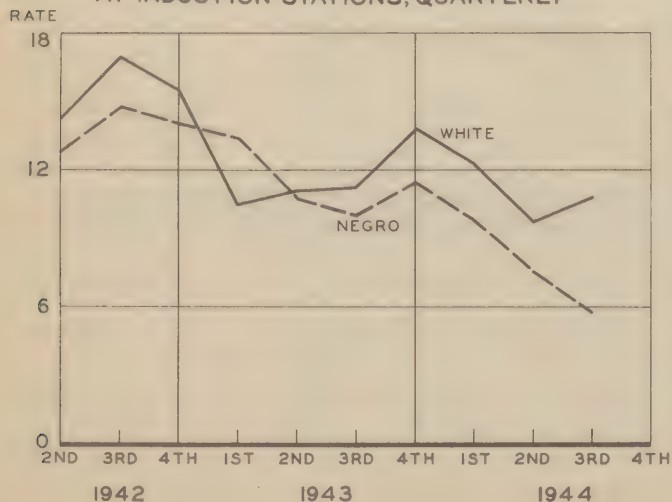
TUBERCULOSIS REJECTIONS, ADMISSIONS, AND DISCHARGES

ADMISSIONS PER THOUSAND MEN PER YEAR

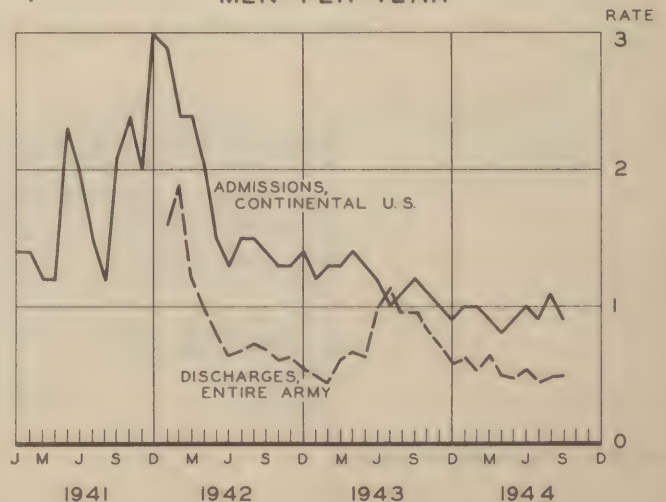
ARMY IN THE CONTINENTAL U.S.



REJECTIONS PER THOUSAND MEN EXAMINED AT INDUCTION STATIONS, QUARTERLY



ADMISSIONS AND DISCHARGES PER THOUSAND MEN PER YEAR



DISEASE AND INJURY

TUBERCULOSIS IN THE ARMY (Continued)

ined were under 20 years of age. The rise in the rejection rate in the latter part of 1943 is in large part fictitious, in considerable measure a consequence of reworking the lists of men previously rejected as the Selective Service System attempted to fill Army and Navy quotas. The current low rate of rejection reflects the fine physical status of the young selectees now presenting themselves for examination.

The admission rate for tuberculosis measures the total number of cases of tuberculosis admitted to hospital for treatment or observation. It includes the active cases discovered and latent cases hospitalized for determination of activity. It is of interest to compare the rates of admission for all forms of tuberculosis (more than 90 percent being for pulmonary tuberculosis) for this war with those recorded for three years including the period of World War I. The current U. S. rates are approximately one-tenth of those which prevailed in the last war. The drop reflects the lowered incidence of tuberculosis in the present period and the greatly improved procedure for excluding cases at the induction physical examinations. A significant feature of the rates for each period, shown graphically on the preceding page, is the early rise, believed to reflect the imperfections of the initial mobilization period when methods were undeveloped, personnel was gaining experience, and many cases failed to be detected. The high admission rate represents a weeding-out of cases admitted during this early period. The succession of peaks, reaching a rate of 3 per 1,000 men per year between May 1941 and May 1942, probably represents in large measure the discharge of men admitted in the first rapid mobilization, when a million men were accepted without x-ray examination. The low rate after that point describes a period when all men had been x-rayed before acceptance.

Attention is called to the second hump in the admission rate for tuberculosis in World War I, representing tuberculosis discovered on discharge. A similar rise may reasonably be expected with mass demobilization and the attendant re-x-ray examination in this war.

As in World War I, the admission rate for tuberculosis overseas has been consistently lower than that for troops in the Continental United States. The relatively low rate for most theaters is explained on the basis of the screening effected during training preliminary to going overseas. While x-ray examination is not routinely repeated, it is regularly carried out when there is any suspicion of chest disease. The Army overseas thus represents a selected group of men who have had months of Army experience during which the less fit have been removed. One conspicuous exception is the Latin American Theater, where the relatively high rate reflects the presence of the Puerto Rican group with a rate considerably in excess of the average for the Army.

The trend of discharge from the Army because of tuberculosis is indicated in the right-hand chart above, where the U. S. admission rate and the discharge rate for enlisted men have been drawn to a scale different from that used in comparing World War I and II rates. The rate has varied in the last three years from approximately 2 to 0.5 discharges per 1,000 men per year, and has been markedly affected by changes in administrative policy. In early 1942 many men were discharged who were found not to meet the current rigid standards for induction. The large number of men who had been admitted without x-ray examination included numerous cases of active tuberculosis and inactive tuberculosis of an extent not acceptable under the provisions of the current mobilization regulations. What was considered to be an unjustifiable waste of capable manpower was stopped in April 1942 when a directive (War Department Circular No. 98, 3 April 1942) was promulgated, prohibiting the discharge of men with inactive tuberculosis. The effect of this directive is shown in the steep downward slope of the curve for the first half of 1942. In the spring of 1943 War Department Circular No. 109 ordered the prompt discharge of cases of tuberculosis and their transfer to the Veterans Administration. Active cases, previously held in Army hospitals, were separated from the service at a rate greatly exceeding that which had prevailed over the past year. The effect of this directive is clearly shown in the trend of discharge. The rate subsided only slowly after the issuance of this directive, because another order (War Department Circular No. 161, 14 July 1943) directed that, with certain specified exceptions, all men not meeting the prescribed minimum standards for induction would be discharged from the service. After this last weeding-out, the general policy on discharges was changed so as to retain in the Army all men below minimum standards who could effectively fill some position in the service. This operated to keep in the Army minimal, apparently stabilized cases which might have been discharged previously. As a result the discharge rate soon dropped to the current low level of approximately 0.5 per 1,000 per year, a figure representing approximately 3,500 discharges per year in an Army of seven million enlisted men. For enlisted men of 30 to 34 years of age, the discharge rate is double, and for men over 40 it is about five times the average for all ages.

DISEASE AND INJURY

VALUE OF DDT IN INSECT CONTROL

Wide and skillful use of a relatively new chemical compound, DDT, should assist greatly in reducing noneffective rates from insect-borne diseases in the Army, and have profound health and economic implications for the postwar world. DDT is a symbol for the chemical name dichloro-diphenyl-trichloroethane. The chemical was first synthesized in Germany in 1874 but little further work on this compound was done until 1939 when a Swiss report credited it with insecticidal properties against moths and certain agricultural pests. In 1943 the laboratory of the Bureau of Entomology and Plant Quarantine of the U. S. Department of Agriculture, established at Orlando, Florida, for the investigation of insecticides and repellents for the armed forces, discovered the value of DDT as a louse and mosquito insecticide. Since that time extensive further research has been conducted by the various agencies of the Office of Scientific Research and Development. In February 1944 The Surgeon General was directed by the Commanding General, Army Service Forces, to coordinate research on the compound and to control its distribution to the armed forces.

DDT is a white crystalline substance insoluble in water but easily soluble in oil or crude kerosene up to 5 percent. Greater concentrations require other commercially prepared solvents. Several commercial firms are now manufacturing DDT under War Production Board priorities and the output has reached over a million pounds per month. It is anticipated that adequate quantities will be available in foreign theaters as soon as transportation difficulties are overcome. The Army supply of DDT is procured and issued by the Quartermaster Corps. It is available in the form of various powders and sprays (see War Dept Circ. 151, 17 April 1944). The uses of DDT are protean but its chief military value lies in the control of malaria, dengue, filariasis, fly-borne diseases, sandfly fever, louse and flea-borne typhus, and plague. In the control of mosquitoes there is evidence that the use of DDT as a residual spray in Army installations and nearby native habitations is highly efficient. Thorough treatment of such buildings is effective for as long a period as three months and will kill all adult mosquitoes present, many of which may be infected with malaria, dengue, or filariasis. Spraying of vegetation around outdoor gathering places, e.g. where moving pictures are shown, will greatly reduce chances of infection. As a larvicide, 5 percent DDT in No. 2 Diesel oil has no peer. Greatly reduced amounts of oil are required and, in selected sites, as little as 1 quart of this solution to the acre may give completely effective control of breeding.

The control of mosquito and fly-borne diseases in forward combat areas is being accomplished in many instances through the use of a 5 percent solution of DDT in oil sprayed by aircraft. Such a procedure yields gratifying adult and larvicidal control of both mosquitoes and flies until such time as ground service personnel can take over the operation. The recent flare-up of dengue on Saipan and Guam is said to have been quickly brought under control once DDT was used. In the control of fly-borne diseases similar methods may be employed. The use of residual sprays should be concentrated in kitchens and mess halls. Fly breeding areas such as garbage disposal sites and latrines must be heavily treated. The use of larvicide DDT powder dusting or the residual spray on latrine contents at frequent intervals has been found to eliminate this important source of fly-breeding.

The value of DDT in the control of epidemic typhus was well demonstrated in the Naples epidemic of December 1943-January 1944. Clothing impregnated with DDT will destroy lice even after 6 to 8 washings. Thorough dusting of the body and clothing with DDT delousing powder will completely destroy all lice but not their ova. The louse powder is an effective prophylactic where uninfested troops must intermingle freely with a louse-infested population. Similarly, good results may be expected where louse-borne relapsing fever threatens. The delousing liquid is an excellent agent for the control of the head louse. Applied to the floors and lower two feet of the walls of buildings DDT sprays and dusts have been effective against fleas and sandflies. DDT dusts have also given excellent results when used on the sites of sandfly breeding. Spraying of 5 percent DDT solutions in kerosene into cracks and crevices in walls and on bedsprings, coupled with the use of DDT dusting powder on mattresses and bedcovers, will rid barracks of bed bugs for as long as three months following a single application. Cockroaches in mess halls and kitchens may be controlled by the same methods used for houseflies.

Despite the excellence of DDT as an insecticide, it should not be used to the exclusion of other methods for the control of insect-borne diseases. It should not be expected to replace but rather to strengthen other control measures. Only by using every possible means can the incidence of insect-borne diseases be minimized.

DISEASE AND INJURY

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HEALTH OF THE WAC

Since April 1944, stations in the Z/I having a WAC strength of more than 300 have submitted separate reports on the health of such personnel. These reports, covering more than 40 percent of the total strength of the Corps, present a good comparative picture of the health of the WAC in the United States during the spring and summer months.

For the six-month period ending September 1944, the admission rate of 932 per thousand for all causes among the WAC was about 60 percent higher than that for all Army personnel, for disease about 70 percent higher, and for injuries practically the same. This higher morbidity of the WAC reflects the well-known fact that women have higher sickness rates than men. During 1942 and 1943 the rate of absenteeism for women employed in industry is reported to have been more than 50 percent higher than that for men. The WAC admission rate for colds, influenza, etc. during the six-month period ending September 1944 was about 60 percent higher than that for men. It is noteworthy that during 1942 and 1943 the annual number of absences on account of colds, influenza, etc. per thousand industrial workers was more than 80 percent higher for women than for men. This suggests that the differential in morbidity between the WAC and male Army personnel is likely to be even greater during the winter months. A recent study presented before the American Academy of Ophthalmology and Otolaryngology found that women were half again as likely to get colds as men and that the average woman lost 4.9 days a year from colds in comparison with 2.7 days for the average man. The admission rate for diarrheal complaints among the WAC has been more than double that for male Army personnel. This also conforms to the reported experience of male and female industrial workers. The admission rate for neuropsychiatric disorders has been about 20 percent higher for the WAC than for men. This is decidedly better than the experience in industry, where the annual number of absences per thousand persons on account of neurasthenia and like conditions has been reported to be six or seven times higher for women than for men. Although information is not available on the extent of morbidity among the WAC traceable to gynecological disorders, it may be noted that female industrial workers reported five times as many absences for conditions of the genito-urinary system as did males. These conditions accounted for about 7.5 percent of the absences among female industrial workers during the years 1942-1943.

On the other hand, for the WAC rates for pneumonia, for the common communicable diseases such as measles, mumps, and scarlet fever, and for rheumatic fever have been only about half the rates among men. The incidence of venereal disease has been only about a third that for male Army personnel. Moreover, the incidence of venereal disease among Negro WAC personnel has been about eight times that among white members of the WAC, substantially the same color differential as has been noted for male personnel.

The indications are that most of the excess morbidity from disease among the WAC represents relatively minor ailments such as colds and influenza, diarrheal complaints, gynecological disorders, and relatively mild neuropsychiatric conditions. This is borne out by the fact that the number of WAC remaining in station and regional hospitals per thousand strength has been somewhat less than for other Army personnel. This implies a shorter average duration of hospitalization for the WAC, which corresponds to a shorter average period of absence for females in industry, and is indicative of less serious reasons for hospitalization than in the case of men.

ADMISSIONS PER THOUSAND U.S. STRENGTH PER YEAR, APRIL THROUGH SEPTEMBER 1944,
WAC AND TOTAL ARMY, BY CAUSE

| Cause | WAC | Total Army |
|-----------------------------------|------|------------|
| All Causes | 932 | 577 |
| Disease | 860 | 507 |
| Injury | 72 | 70 |
| Colds and Influenza | 153 | 95 |
| Pneumonia | 4.4 | 8.4 |
| Measles, Mumps, and Scarlet Fever | 5.2 | 8.4 |
| Diarrhea and Dysentery | 20.3 | 9.8 |
| Neuropsychiatric Disorders | 40.1 | 34.2 |
| Venereal Disease | 12.3 | 33.4 |
| Rheumatic Fever | 0.9 | 1.6 |
| Tuberculosis | 0.8 | 0.9 |

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DISEASE AND INJURY

DENTAL INFECTION AND INJURY

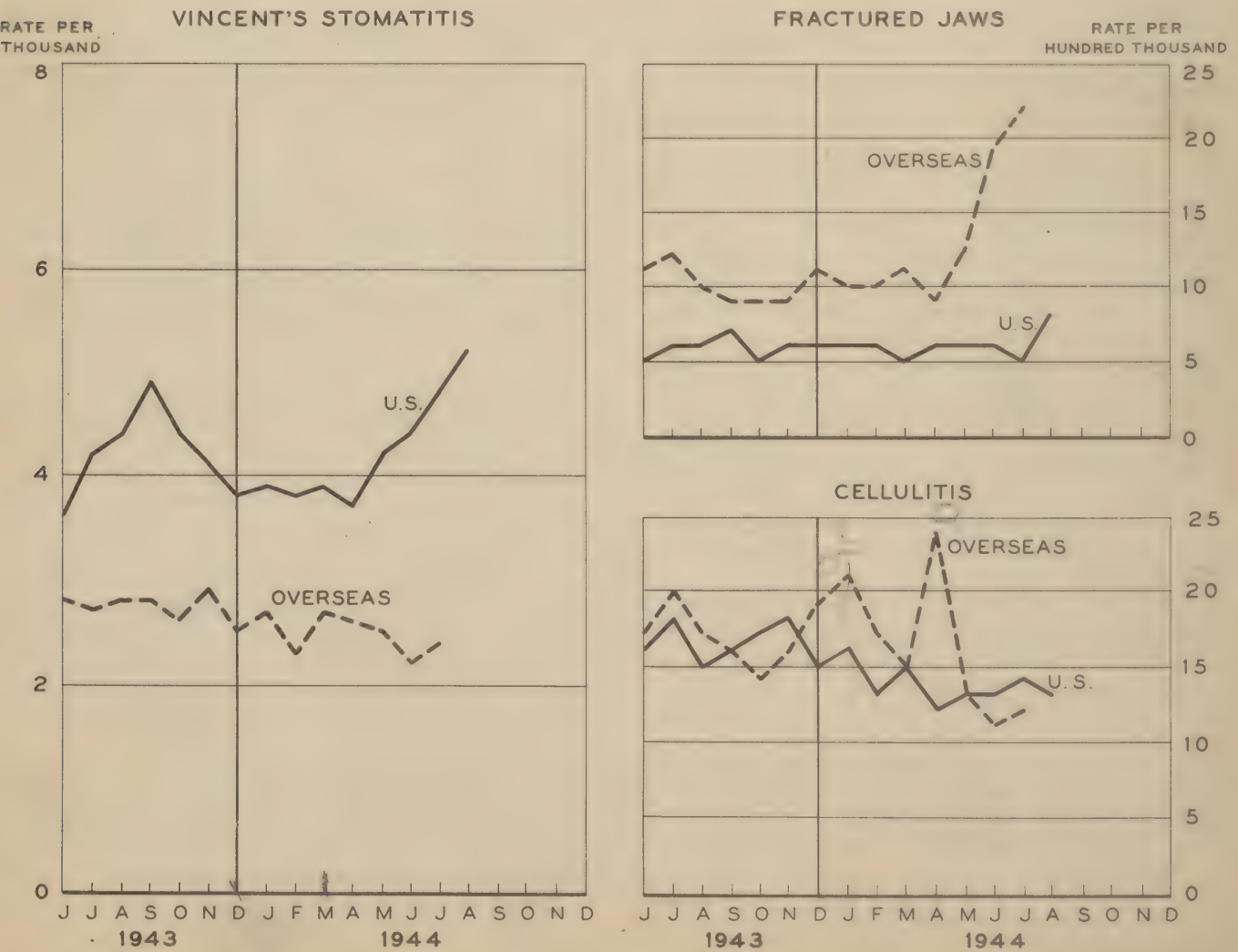
Vincent's Stomatitis, or trench mouth, has presented no serious problem to the Army during this war. Although there has been a steady rise in the rate of admission in the U. S. since April 1944, and the rate of 5.2 per thousand men per month for August is the highest in two years, the present rates are still below the level which might be expected in time of war. Since the sharp rise in March and April 1943 the overseas rate has remained under three per thousand per month. Overseas the incidence has been generally higher in areas where troops are in relatively close contact with the civilian population. There is little relation between the frequency of Vincent's Stomatitis and combat.

In contrast, the rate for fractured jaws reflects combat engagements to a marked degree. The precipitate increase in jaw fractures overseas for June and July of 1944 can be attributed, in large measure, to the hedge warfare during the initial invasion of the European continent. The experience of the last war proved that facial injuries are higher for soldiers in trenches than for troops on the move. The hedges in Normandy provided conditions comparable to trench warfare. In addition to the marked increases in recent months in the European Theater, increases were noted in all Pacific Theaters and in the Middle Eastern and Persian Gulf areas, while the North African Theater reported a decline in incidence.

Cellulitis, a result of dental infection, has been slightly more frequent among overseas troops than among the troops in the Continental U. S. After its rise to the peak of 24 per 100,000 men per month, the overseas rate has declined until it is now below the rate for troops in the Continental U. S. for the first time since October 1943. The two high points in June and April of 1944 resulted from increases in the European Theater.

For the first half of 1944, the rate for osteomyelitis has been consistently about .005 per thousand men per month in the Continental U. S. and has varied between .006 and .007 per thousand men in the overseas theaters.

DENTAL INFECTION AND INJURY PER THOUSAND OR HUNDRED THOUSAND MEN PER MONTH



DISEASE AND INJURY

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HEALTH BRIEFS

TRENCH FOOT

In November 1943 trench foot began to appear in 5th Army combat units exposed to wet and cold in Italy, and throughout the winter caused a serious drain upon the strength of forward units, about five thousand men having been hospitalized for this preventable condition (see HEALTH for June 1944) from which the British troops in Italy suffered very little. It is hoped that this experience will not be repeated in France and Germany and again in Italy. A recent technical medical report from ETO states, in part, "The problem of overshoes and shoepacks is most urgent if the incidence of trench foot is to be kept to a minimum. At present the Quartermaster supplies of rubber overshoes are sufficient for only 40 percent of the total troop strength; the remainder will have to be equipped with supplies shipped from the States. It is planned to equip one field army with shoepacks when the supply likewise arrives from the United States".

DENGUE IN THE MARIANAS

An extensive epidemic of a mild form of dengue began on Saipan in July, after that island had been secured by U. S. forces. Estimates of its incidence from July to 15 September vary from 50 to 70 percent of U. S. personnel on Saipan and 45 to 65 percent on Guam, according to preliminary reports. The disease has been generally mild in nature, but second attacks within two months are claimed for about 10 percent of the personnel of the 27th Infantry Division. Jaundice is reported as a complication in some cases. Intensive anti-mosquito control was not begun until well after the operation had been concluded. During September a supply of DDT was obtained, and at this writing the hazard should be well under control for non-immune personnel newly arriving in the area. Dengue can be a severe, prostrating disease, despite its usual brevity and non-fatal character. In the Philippines it will constitute an especially serious problem. Anti-mosquito discipline and control measures afford the only protection against it.

IMMUNIZATION AGAINST JAPANESE B ENCEPHALITIS

A specific virulent type of encephalitis, termed Japanese B Encephalitis, is prevalent throughout Japan, in Thailand, Formosa, in China north of Shanghai and in the region of Vladivostok and the Russian border of Manchuria. The disease has a very high case fatality rate, reported to reach 70 percent in certain epidemics. It is mosquito-borne and occurs in the late summer.

Russian scientists report that a mouse-brain vaccine is effective in reducing the incidence and mortality of this disease. Since 1942 the Commission on Neurotropic Virus Diseases of the Army Epidemiological Board has been working on the same problem and has developed a mouse-brain vaccine which has been shown to be antigenically potent and has received trial on human subjects.

The decision has been made to procure a substantial supply of this vaccine, and steps have been taken to initiate production at once. The general immunization of United States troops is not contemplated, but it is considered wise to have a stock of vaccine for possible use in troops who will enter the endemic area.

SCRUB TYPHUS IN THE SOUTHWEST PACIFIC

The severe epidemic during July and August (see HEALTH for August) abated progressively during September and October until only sporadic cases were being reported. In addition to more than 1,000 cases at OwI and Biak, there had occurred 900 or more at Sansapor, and 300 at Aitape, by the middle of September. The case fatality rate in these areas ranged from one to 2.5 percent. The outbreak at Sansapor was similar to that at OwI and Biak, troops not being equipped initially with the impregnated clothing which protects against the carrier mites. The flood of cases overtaxed the facilities of the one available evacuation hospital.

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HOSPITALIZATION

HOSPITALIZATION IN THE MEDITERRANEAN THEATER AND THE SOUTHWEST PACIFIC AREA

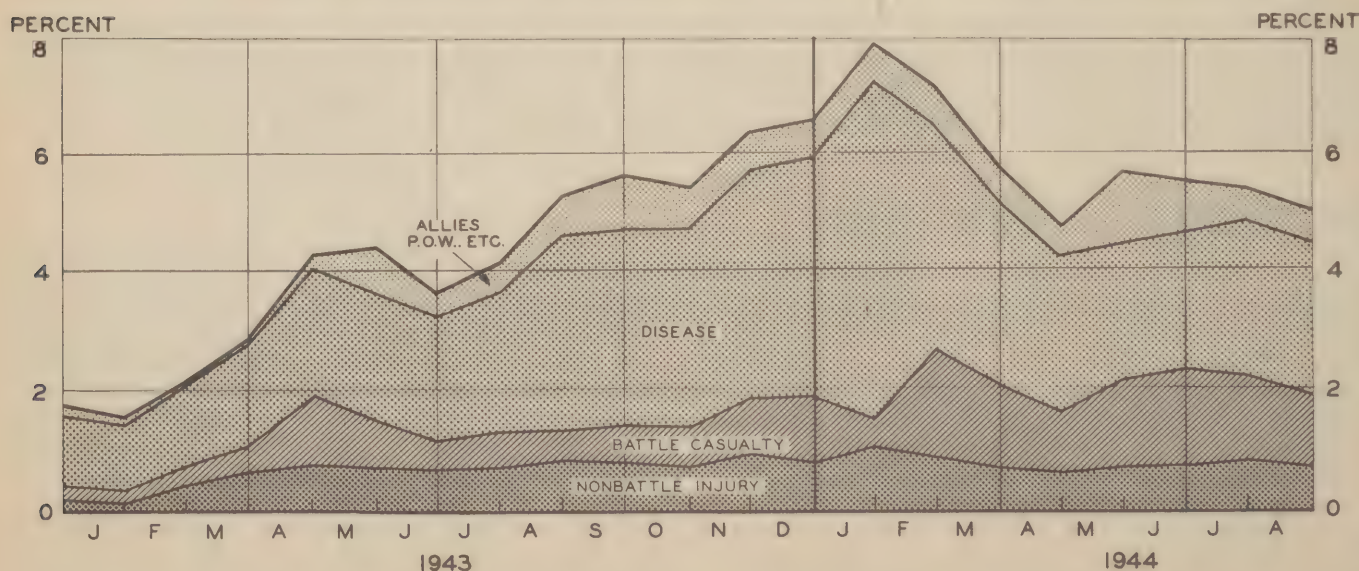
The past hospitalization experience of a theater may throw considerable light upon its future bed requirements if account is taken of the character of future operations. The charts below, and on the following page, detail the essential aspects of hospitalization in what is now the Mediterranean Theater and in the Southwest Pacific Area. The panels depict the composition of the hospital load in each theater since early 1943 or late 1942. The total number of patients in hospital is represented by the top line, and the area below it is subdivided in order to show the number of Army patients suffering from disease, non-battle injury, and wounds received in action, as well as the total number of non-Army patients in hospital. All the data are expressed as percentages of U. S. Army strength in the theater.

The hospital population in North Africa built up slowly throughout the first half of 1943, as is customary when an expeditionary force retains its casualties and sick in hospital. The first peak occurred in April and May as a result of the accumulation of battle casualties during the Tunisian campaign. During June, in the tactical lull before the landing in Sicily, the battle casualty population declined as did the total load. Thereafter, except for a short period in January 1944, the proportion of battle casualties increased to entirely new levels. However, the hospital disease population was the major factor determining the percent of theater strength needing hospital treatment. Successive waves of various communicable diseases and non-battle injuries poured men into the hospitals. There was an explosive epidemic of diarrhea and dysentery in June, followed by fairly high rates throughout July, August, September, and October. Added to this was the influence of the malaria season during the late summer and fall of 1943. As the incidence of these diseases declined they were replaced by a rising wave of infectious hepatitis, the usual winter respiratory epidemic, and a high incidence of trenchfoot (erroneously classified as a disease) among the combat troops of the 5th Army. The percentage of U. S. Army strength in hospital as a result of non-battle injuries remained relatively stable during the entire period of 20 months which is shown. After January the declining importance of disease as a cause of hospitalization more than offset the increased casualties sustained during the battles below Cassino, so that the total number of patients in hospital declined. However, the spring offensive, and the need for increased hospitalization in support of the French forced up the hospital population in June and subsequent months, and through September it remained generally above the low point which obtained at the end of the winter campaign in Italy.

Until the middle of 1942, from one-sixth to one-fourth of all U. S. Army patients requiring hospitalization in the Southwest Pacific Area received treatment in Australian hospitals. At the beginning of July 1942, only 3.2 percent of the U. S. Army strength in the theater was in hospital, 0.6 percent being in Australian and 2.6 percent in American units. About 0.1 percent of U. S. strength has been constantly in Australian hospitals since October 1942. The real accumulation of hospital patients in the SWPA did not occur until the opening of the Papuan Campaign, when it was driven sharply upward by malaria in epidemic proportions, diarrhea and dysentery, and the highest battle casualty rates in the history of the theater.

HOSPITALIZATION IN THE MEDITERRANEAN THEATER

ALL PATIENTS IN HOSPITAL AS PERCENT OF STRENGTH



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HOSPITALIZATION

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HOSPITALIZATION IN THE MEDITERRANEAN THEATER AND THE SOUTHWEST PACIFIC AREA (Continued)

In three months the hospital population advanced from 3.6 percent of strength in October 1942 to 9.2 percent of strength at the end of January 1943. At this time 82 percent of the hospital load was made up of U. S. Army patients, the remaining 18 percent being composed of Australian troops, New Guinea natives, and other U. S. military personnel. Following the Buna-Gona Campaign, as sections of New Guinea assumed the status of base commands, as malaria was brought under control, and as combat troops moving along the northern shore of New Guinea became a smaller proportion of the theater strength, the admission rates for disease declined together with those for battle casualty. Concurrently the proportion of non-Army patients also declined. As in North Africa the percent of strength in hospital as the result of non-battle injury has remained relatively constant, but at a slightly lower level. The proportion of the hospital load attributable to the care of battle casualties increased slightly during the first 8 months of 1944, but the total hospital population remained relatively constant after a decline of 50 to 60 percent below the peak of January 1943. The panels on the following page give the proportion of strength in hospital according to the type of facility occupied. The totals shown are the same as those drawn in the charts on this and the preceding page. A shorter interval is used because reports listing patients in mobile and fixed units were not available prior to September or October 1943.

On 18 October The Surgeon General completed a study of theater requirements for fixed bed units and recommended that the authorization of the Mediterranean Theater remain at 6.6 percent of U. S. Army strength there but that the authorization for the Southwest Pacific Area be reduced from 8.0 percent of strength to 7.0 percent. The recommended levels are tabled below. The determination of these authorization levels is dependent upon the development of estimates of:

- Number of Army patients needing hospital care.
- Length of treatment and speed of evacuation.
- Extent of hospitalization in support of allied units, civilians, and prisoners of war, and other U. S. military personnel.
- Extent to which U. S. personnel will be cared for in other than U. S. hospitals.
- Extent of utilization of mobile facilities.
- Hospital dispersion.
- Theater dispersion.
- Availability of medical personnel for deployment.
- Desired availability of a theater reserve for contingencies.

HOSPITALIZATION IN THE SOUTHWEST PACIFIC AREA ALL PATIENTS IN HOSPITAL AS PERCENT OF STRENGTH



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HOSPITALIZATION

HOSPITALIZATION IN THE MEDITERRANEAN THEATER AND THE SOUTHWEST PACIFIC AREA (Continued)

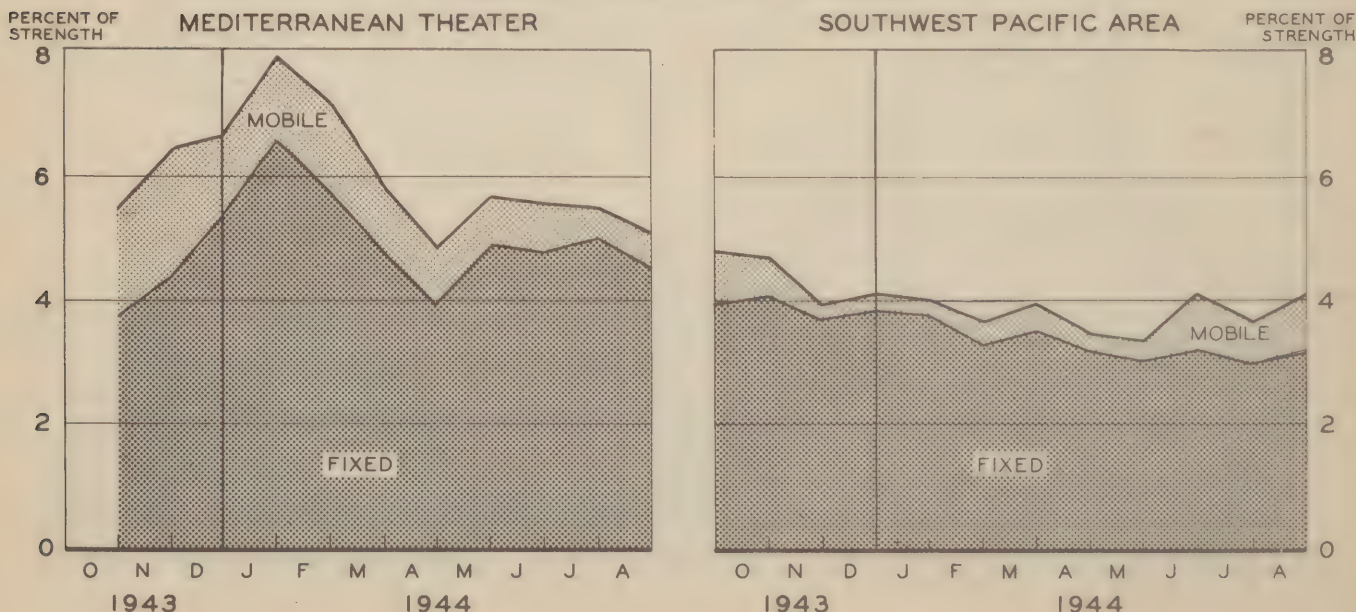
The charts on the following page summarize and compare the averages and peaks of the series shown on this page and the preceding pages with the current W. D. authorization for fixed bed units and the levels of authorization recently recommended by The Surgeon General. The first series of bars gives the average and highest percentages for the theater by type of patient. The second series presents similar data for fixed beds only with a light extension to show how many beds would be needed were allowances made for 20 percent dispersion of beds within hospitals and 10 percent among hospitals in the theaters because of staging, forward movement, and the like. The heavy horizontal line gives the current W. D. authorization for fixed bed units and the lower dotted line the number of "usable" beds assuming the same two types of dispersion of the beds provided by the authorized level. The fifth bar gives the recently recommended level of authorization broken down into the components which it provides. In North Africa, the average percent of strength in hospital from 2 October 1943 through 25 August 1944 was 5.22 percent for Army patients, and .73 for other patients, making a total average hospital load of 5.95 percent. Eighty-one percent of these patients were cared for in fixed units. Allowance of 20 percent for hospital and 10 percent for theater dispersion, applied on top of the average fixed bed occupancy of 4.8 percent, connotes a requirement of 6.7 percent. That this requirement is conservative is readily seen from the charts on the foregoing page. It may be of value to note that a 20 percent dispersion means that 20 out of 100 total beds are provided as dispersion. In relation to the 80 usable beds it amounts to 25 percent.

The average rates for the Southwest Pacific are misleading as estimates of future need, but are included in the appropriate panel below. The peak experience of this theater was reached before the reports providing bed occupancy by type of unit were available. Therefore this aspect of the peak experience has not been summarized for the hospitalization of 9.2 percent of strength which obtained at the end of January 1943.

The average number of fixed beds occupied in the Southwest Pacific was 3.35 between October 1943 and the end of August 1944. Applying 20 percent hospital dispersion and 10 percent theater dispersion to this average, obviously unrepresentative for future experience, results in a calculated "need" of only 4.66 percent. The 7.0 percent recommended to the War Department is a more reasonable level. However, it provides for only 10 percent theater dispersion and there is evidence that the need for transporting units over great distances and at relatively frequent intervals may well necessitate a greater allowance for theater dispersion. At the end of each of the months from June to September, 40, 38, 25, and 36 percent respectively of all beds (T/O capacity) in the theater were unavailable because they were either constructing, staging for shipment, or enroute to a new destination. The percentages for mobile units were 0, 33, 9, and 28 while they were 44, 39, 26, and 37 for fixed hospitals. If the allowance of 10 percent for theater dispersion were increased to only 25 percent the recommended allowance of 7.0 percent would be increased to 8.4 percent.

HOSPITALIZATION IN FIXED AND MOBILE UNITS

BEDS OCCUPIED AS PERCENT OF STRENGTH



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HOSPITALIZATION

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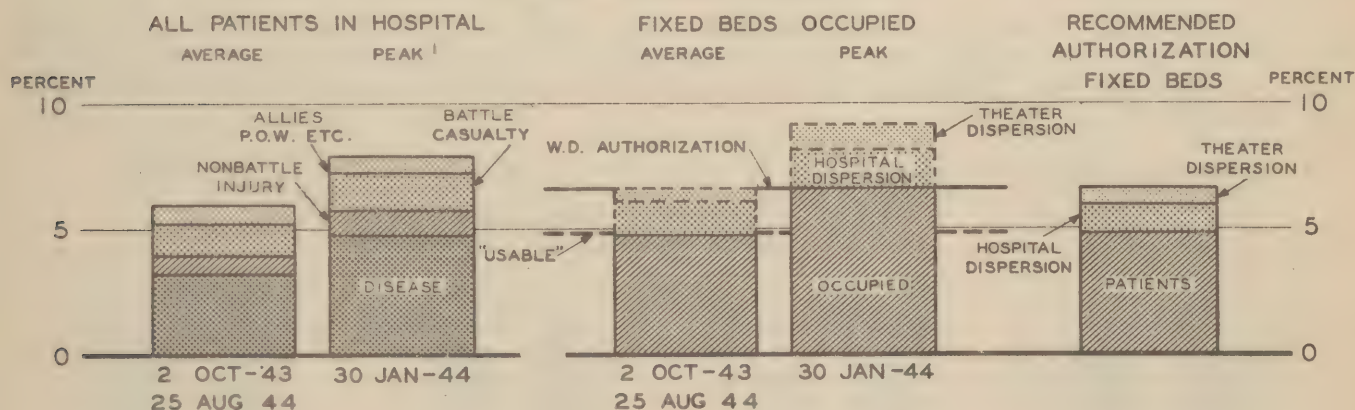
HOSPITALIZATION IN THE MEDITERRANEAN THEATER AND THE SOUTHWEST PACIFIC AREA (Continued)

Present and Recommended Minimal Percentages For Fixed T/O Beds by Theater

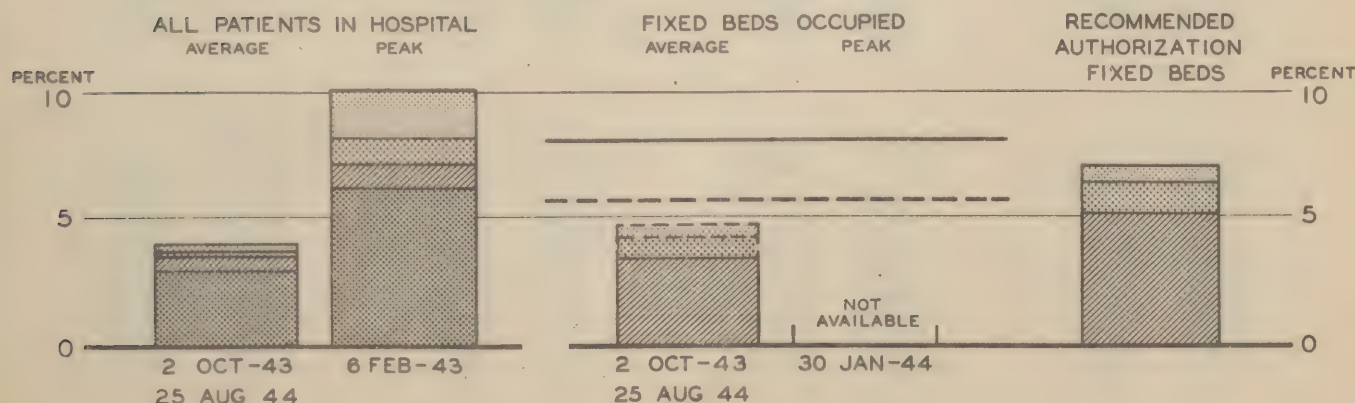
| COMMAND | PERCENT OF STRENGTH | |
|-------------------|-----------------------|-------------|
| | Present Authorization | Recommended |
| American | 4.0 | 3.0 |
| European | 7.0 | 7.0 |
| Mediterranean | 6.6 | 6.6 |
| Middle Eastern | 6.0 | 6.0 |
| Persian Gulf | 6.0 | 6.0 |
| Asiatic | 7.0 | 6.0 |
| Southwest Pacific | 8.0 | 7.0 |
| South Pacific | 6.0 | 6.0 |
| Central Pacific | 5.0 | 6.0 |
| Strategic Reserve | - | 4.0 |

The recommended allowances are minimal, and represent in part the budgeting of a general shortage of units. Most theaters state their requirements at higher levels. It must be borne in mind, however, that for each 100 fixed T/O beds there is provided expansion equipment (but no personnel) sufficient for an additional 50 beds. Hence the authorized level should be viewed as an average level, the peak loads to be taken care of by expansion beds. Chronic overcrowding, however, impairs hospital efficiency. Finally, a fluid reserve is recommended so that emergency needs can be met promptly. At the present time the theaters maintain any reserves which may be thought to exist, and they are relatively inflexible in consequence.

PATIENTS AND FIXED BEDS AS PERCENT OF STRENGTH MEDITERRANEAN THEATER



SOUTHWEST PACIFIC AREA



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HOSPITALIZATION

PROVISION OF FIXED HOSPITALIZATION OVERSEAS

On 1 October T/O fixed bed capacity in overseas theaters was 88 percent of the level authorized by the War Department, identical with that for 1 September. The European Theater had 84 percent of its then authorized level of 8 percent of strength (96 percent of the 7 percent level authorized 5 October), North Africa 96 percent, the Pacific Ocean Areas 115 percent, the Southwest Pacific Area 82 percent, and the Asiatic theaters 82 percent. According to the recent revisions of the WD Six Months Troop Forecast, fixed bed capacity in the various overseas theaters is rapidly approaching the levels authorized by the War Department, but these levels themselves are under scrutiny and certain changes may be made. The 20th revision indicates that by March 1945 there should be a substantial deficit only in the Southwest Pacific Area, but even in this instance the projected deficit of 1.3 percent below the authorized level of 8 percent is only 0.5 percent under the theater requisitions amounting to 7.2 percent for that date. War Department approval of newly recommended Southwest Pacific requirements would reduce the authorized level to 7 percent.

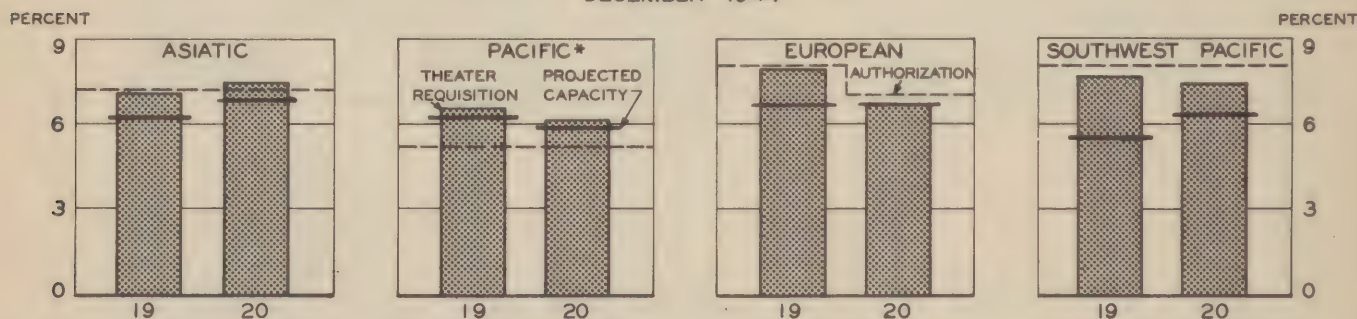
For the most active theaters the accompanying charts give the salient facts for both December 1944 and March 1945 from the 19th and 20th revisions of the WD Six Months Troop Forecast. In addition to the WD authorized level, the charts give the number of beds requisitioned by the theater, and the projected number of beds available (already provided plus projected) in fully trained units as percentages of theater strengths. At the end of December 1944 a serious shortage, in terms of current WD authorizations, is forecast by the 20th revision for only the Southwest Pacific Area. Its projected availability of 6.3 percent for that date is also below the 7 percent level recently recommended to the War Department. The reduction in the December requisition figure for the European Theater reflects the change in strength between the 19th and 20th revisions and a shifting of some requests from December to January. Any shortages in the European Theater are being alleviated by the shipment of units in current status of training sent at the request of the theater but excluded from the forecast as shown. The apparent surpluses forecast for the Pacific Ocean Areas must be considered in the light of the 5 percent authorization which still stands for the strength of the Central Pacific, where increasing operations in enemy territory will probably support an increase to the 6 percent level which has been recommended by The Surgeon General and is equivalent to that which governs the South Pacific. The strength used for the Asiatic theaters includes the 57,000 Chinese troops for which the WD authorization is 8 percent.

The lower levels forecast for March 1945 do not indicate downward revisions in theater requisitions for fixed bed units, but increases in the strengths forecast for that date. This also explains the difference between the 19th and 20th revision forecasts for the Asiatic theaters.

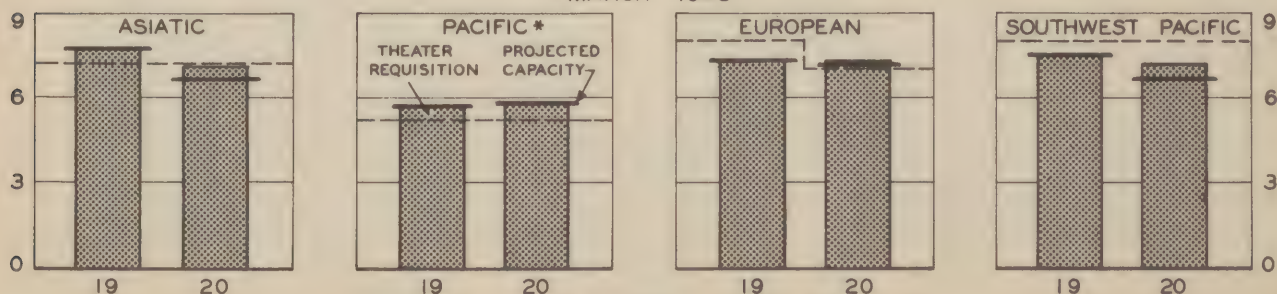
PROJECTED AVAILABILITY OF FIXED HOSPITAL UNITS OVERSEAS

BEDS AS PERCENT OF STRENGTH

DECEMBER 1944



MARCH 1945



REVISIONS OF SIX MONTHS' TROOP FORECAST

*Projected capacity in 20th revision includes 8,700 fixed beds in T/O units in the South Pacific Base Command.

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HOSPITALIZATION

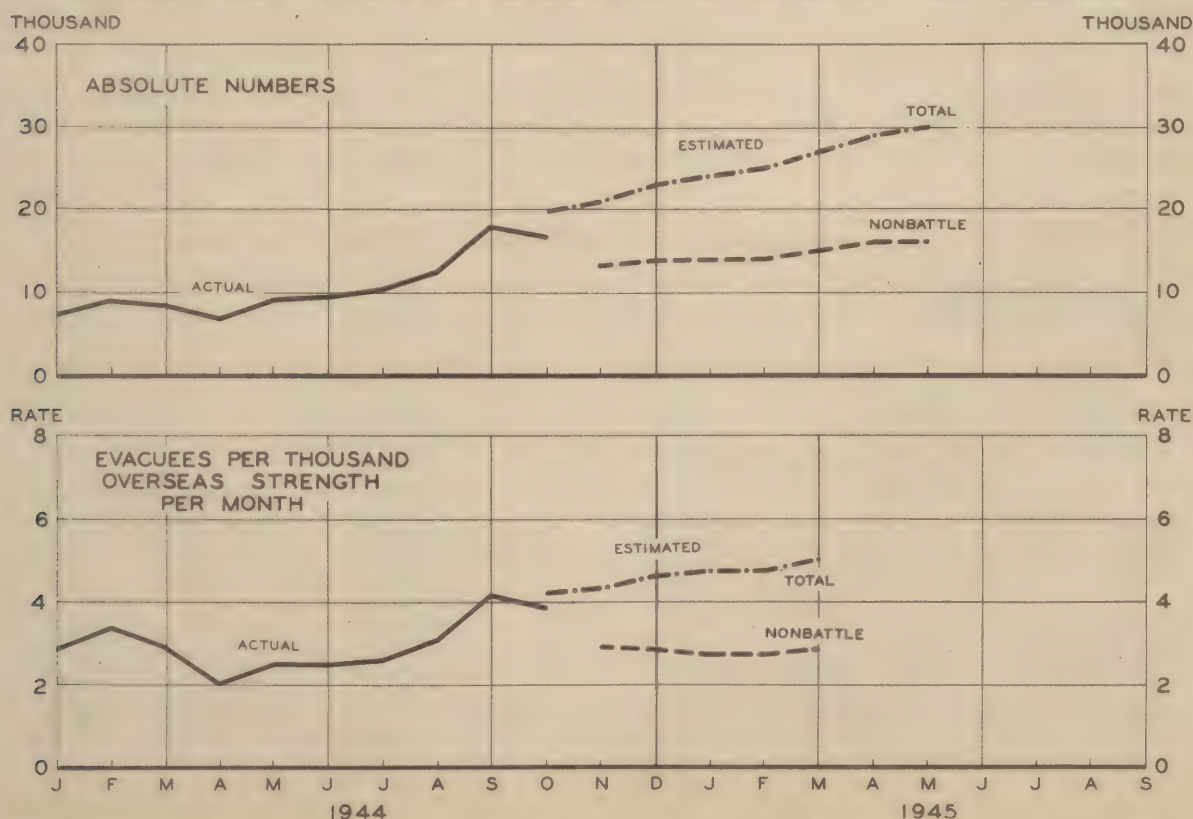
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TREND OF EVACUATION FROM OVERSEAS

The final count of evacuees received during September is about 17,800 Army patients, exclusive of 2,800 P.O.W. patients. During October there was a decline to about 16,500 Army patients, but the P.O.W. evacuees increased to 4,600, according to preliminary reports. The increasing load of P.O.W. evacuees is of outstanding importance. The trend of evacuation for U. S. Army patients both actual and projected is shown below. The lower panel gives the absolute numbers shown in the upper panel as rates per 1,000 overseas strength per month. Although the rate of evacuation declined during October to reach 3.8 per 1,000 overseas strength per month, there was no substantial change in the backlog of patients awaiting evacuation, about 10,500 being reported at the end of the month, 800 of whom were prisoners of war. The backlog in the European Theater remains considerable, air lift having decreased and fewer hospital ships having been made available than had been anticipated. In view of the general shortage of hospital ships it would seem imperative that maximum use be made of returning troop ships for purposes of evacuation.

The projection previously shown on the assumption of continuance of large-scale hostilities in Europe has been revised and extended. It must be borne in mind that cessation of hostilities at any point would markedly increase the rate of evacuation, although no separate estimate is shown on this assumption. The projection has been revised after a review of morbidity and battle casualty rates in each theater, and their projection into the future. In addition the evacuation experience of each theater was studied from the standpoint of the proportion of admissions evacuated to the Z/I (see HEALTH for September). These proportions were further varied seasonally in order to allow for the fact, for example, that an increase in respiratory disease will increase morbidity without having much influence on evacuation. For battle casualties it was assumed that a rate of 200 per 1,000 men per year would continue for the European Theater, 150 for the Mediterranean Theater, 100 to 160 for the Southwest Pacific, and 60 to 110 for the Central Pacific. For forecasting purposes it was necessary to include the Seventh Army in the Mediterranean Theater. A lag of two months between admission and evacuation was assumed for disease, and three months for nonbattle injury and wounded in action. The resulting estimates were prepared to give average rather than either maximum or minimum estimates, but they are somewhat higher than those made in July. The forecasts are shown separately for battle and nonbattle patients. It was assumed that 20 percent of the wounded would be evacuated from all theaters. Were this percentage increased, the battle casualty component would be even larger. The dependence of these estimates upon the casualty rates stated above cannot be overemphasized. Correspondingly higher or lower rates would directly affect the estimates. In this sense they must be viewed as most tentative. Estimates prepared by the various theaters themselves are generally higher than those shown below.

ACTUAL AND ANTICIPATED EVACUATION OF PATIENTS FROM OVERSEAS



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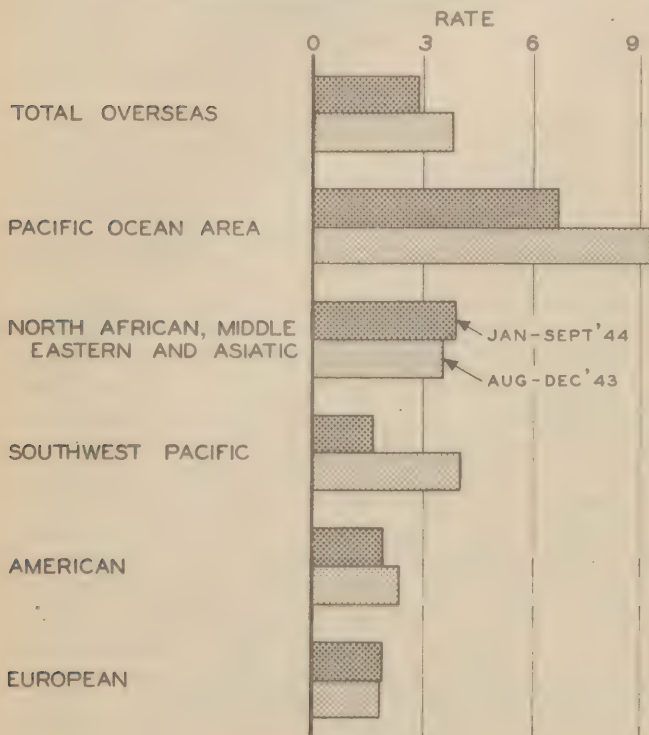
HOSPITALIZATION

TREND OF EVACUATION FROM INDIVIDUAL OVERSEAS THEATERS

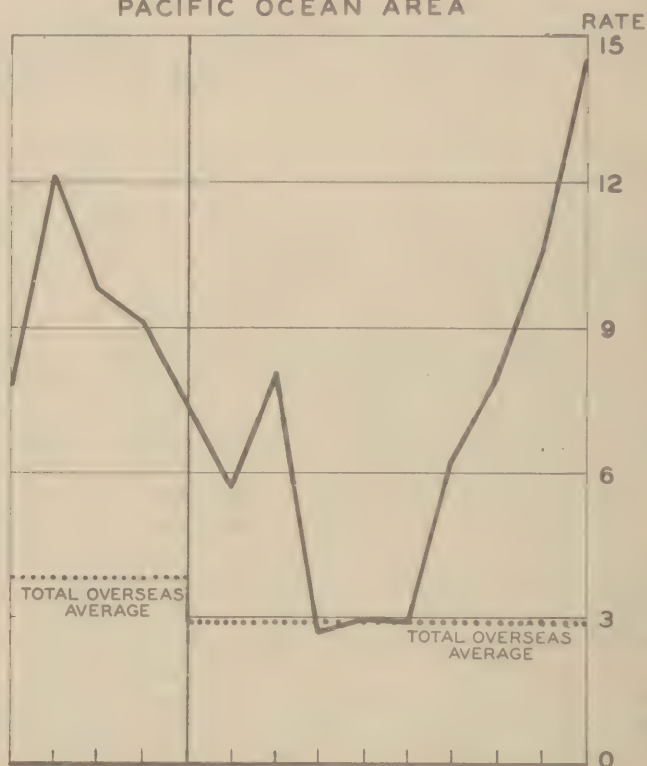
The evacuation rates of individual theaters are quite erratic. The rate for the Pacific Ocean Area, which had been higher than that for any other theater, rose to a new peak of 14.5 per thousand men per month in September. The rate of evacuation from the European Theater rose sharply in October to perhaps 8,400 Army patients. There was a sharp September increase in evacuation from the Mediterranean Theater, about 6,000 Army patients being debarked in the U. S. In October the total was less but still far higher than in recent months.

EVACUEES PER THOUSAND STRENGTH PER MONTH, OVERSEAS THEATERS

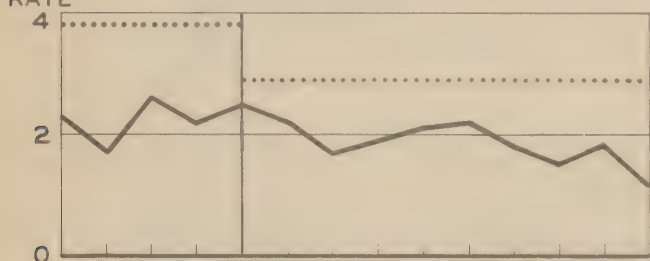
AVERAGES - ALL THEATERS



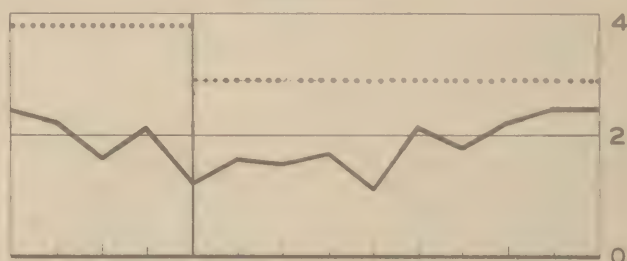
PACIFIC OCEAN AREA



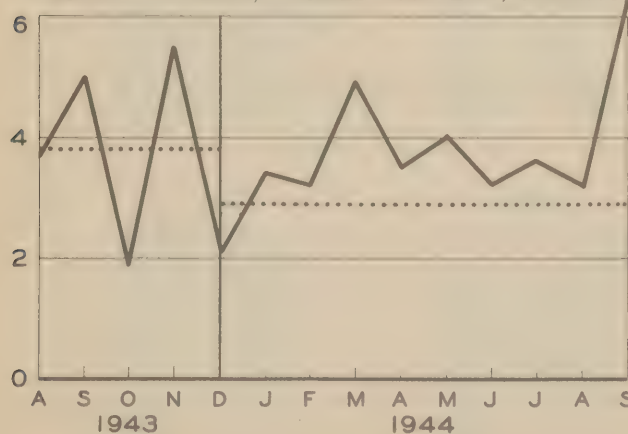
AMERICAN



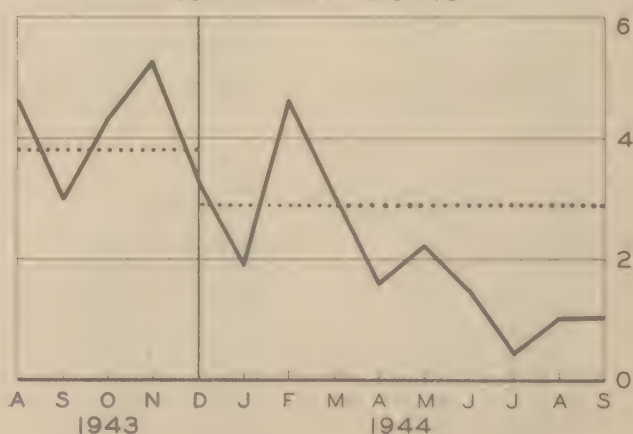
EUROPEAN



NORTH AFRICAN, MIDDLE EASTERN, ASIATIC



SOUTHWEST PACIFIC



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HOSPITALIZATION

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HOSPITALIZATION IN THE ZONE OF INTERIOR

At the end of October there were approximately 114,000 beds authorized in the general hospitals. Deducting approximately 17,500 beds reserved for debarkation patients, prisoners of war, civilians, and other military, and another 14,500 as an allowance for dispersion, there remained 82,000 effective beds available for the treatment of Army patients.

ANALYSIS OF BED CAPACITY OF NAMED GENERAL HOSPITALS October 1944

| | Beds | |
|--|--------|---------|
| TOTAL BEDS AUTHORIZED | | 114,313 |
| BEDS NOT AVAILABLE FOR TREATMENT OF ARMY PATIENTS | | 17,653 |
| Debarkation Beds | 12,256 | |
| Prisoner of War Beds | 3,172 | |
| Credits for VAF | 725 | |
| Provision for Non-Army Patients | 1,500 | |
| BEDS AVAILABLE FOR TREATMENT OF ARMY PATIENTS | | 96,660 |
| DISPERSION FACTOR, 15 PERCENT | | 14,499 |
| EFFECTIVE BEDS FOR ARMY PATIENTS | | 82,161 |

The present authorized capacity of the general hospitals represents an increase of 15,000 beds since the beginning of the year. Although a firm basis for defining bed capacity was not established until the promulgation of Change 2, AR 40-1080, the bed data for the period from January to October 1944 constitute a sufficiently consistent series. It is to be noted that the number of effective beds available for the treatment of Army patients, that is, the total authorized, minus provisions for debarkation, for non-Army patients, and for dispersion, have fluctuated between 81,000 and 84,000 since April. The series on Army patients remaining at the end of the month, which include patients occupying beds in the general hospital proper and occupying spaces in the attached convalescent facility or hospital, and patients on furlough, etc., has, however, shown an upward trend since April. By the end of October there were approximately 95 Army patients remaining within the general hospital system for each 100 effective general hospital beds. Allowance ought to be made for the existence of additional although not equivalent effective capacity in the convalescent facilities and hospitals adjacent to the general hospitals. This can be done as soon as the Assistant Chief of Staff, G-4, authorized the convalescent spaces which have been requested by The Surgeon General.

BED CAPACITY AND ARMY PATIENTS IN GENERAL HOSPITALS, 1944

| End of Month | Authorized Beds | Effective Beds for Army Patients* | Army Patients Remaining | |
|-----------------|--------------------|---|-------------------------|-----------------------------|
| | | | Number | Per 100 Ef- fective Beds |
| January | 98,743 | 74,801 | 58,980 | 78.8 |
| February | 102,250 | 77,778 | 58,811 | 75.6 |
| March | 103,979 | 78,856 | 56,342 | 71.4 |
| April | 108,944 | 83,131 | 54,241 | 65.2 |
| May | 109,227 | 83,185 | 56,151 | 67.5 |
| June | 106,513 | 80,800 | 56,857 | 70.4 |
| July | 110,754 | 84,140 | 58,965 | 70.1 |
| August | 114,406 | 82,866 | 64,558 | 77.9 |
| September | 114,139 | 82,105 | 72,718 | 88.6 |
| October | 114,313 | 82,253 | 78,687 | 95.7 |

* Effective beds exclude debarkation beds and beds for non-Army patients, prisoners of war, civilians, and other military patients, as well as an allowance for dispersion of 15 percent.

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HOSPITALIZATION

HOSPITALIZATION IN THE ZONE OF INTERIOR (Continued)

It is noteworthy that the rate of increase in the number of Army patients remaining in the general hospital system has accelerated within recent months. This fact is attributable to the inflow of evacuee patients from the overseas theaters and to the changing composition of this inflow. The number of patient evacuees has risen from about 11,000 in July to almost 18,000 in September and about 16,500 in October. During this period operations in the European Theater have caused a change in the composition of the evacuees, increasing the proportion of surgical patients among the evacuees. In July, 45 percent of the patients evacuated were surgical and by October the percentage had risen to 64. This changing ratio will itself tend to increase the load on the general hospitals even if there were no increase in the number of evacuees, for surgical patients require the longest period of hospitalization.

At the end of October there were approximately 66,000 beds occupied by both Army and non-Army patients in the general hospitals proper (not counting those on furlough, on sick leave, or AWOL). This number represents 76 percent of the approximately 87,000 effective beds, 82,000 for Army and 5,000 for non-Army patients, which were available at that time for definitive treatment. There were at the time about 59,500 beds occupied in the 54 general hospitals, over 1,000 beds occupied at Glennan General Hospital which is reserved exclusively for German Prisoners of war, and over 5,500 beds occupied in the debarkation hospitals. For the debarkation hospitals the patients occupying beds cannot be separated into those receiving definitive treatment and those being processed. However, it is known that Madigan General Hospital at Fort Lewis has a large number of local patients and that Halloran General Hospital has a substantial number of patients receiving definitive treatment. The extremely high occupancy ratios shown by the debarkation hospitals are therefore more apparent than real, being the necessary result of dividing total patients in the hospital, whether receiving definitive treatment or in triage, by the number of effective beds available for patients requiring definitive treatment only. An analysis of the occupancy ratios by service command clearly indicates that the hospitals in the 1st, 2nd, 3rd, 5th, and 6th Service Commands, or the Northeast and North Central states, are approaching full occupancy. Relatively greater provision for convalescent spaces will have to be made in these areas.

EFFECTIVE BEDS AT GENERAL HOSPITALS
End of October, 1944

| Type of Hospital | Number of Hospitals | Bed Capacity | | Beds Occupied** | |
|---|---------------------|-----------------|-----------------|-----------------|---------------------------|
| | | Authorized Beds | Effective Beds* | Number | Percent of Effective Beds |
| ALL GENERAL HOSPITALS | 60 | 114,313 | 86,741 | 66,363 | 76.5 |
| 54 GENERAL HOSPITALS (Less Debarkation and POW) | 54 | 97,920 | 82,071 | 59,480 | 72.5 |
| Service Commands | | | | | |
| First | 2 | 4,140 | 3,519 | 3,555 | 101.0 |
| Second | 4 | 8,665 | 6,940 | 5,229 | 75.3 |
| Third | 3 | 4,815 | 4,093 | 3,674 | 89.8 |
| Fourth | 9 | 16,994 | 14,445 | 8,302 | 57.5 |
| Fifth | 8 | 12,741 | 10,830 | 8,935 | 82.5 |
| Sixth | 4 | 5,881 | 4,999 | 4,448 | 89.0 |
| Seventh | 4 | 8,928 | 7,589 | 5,483 | 72.2 |
| Eighth | 9 | 17,420 | 14,680 | 10,226 | 69.7 |
| Ninth | 10 | 16,279 | 13,228 | 7,805 | 59.0 |
| The Surgeon General (Walter Reed) | 1 | 2,057 | 1,748 | 1,823 | 104.3 |
| DEBARKATION HOSPITALS | 5 | 14,703 | 3,233 | 5,738 | 177.5 |
| Service Commands | | | | | |
| Second | 1 | 4,308 | 1,283 | 2,054 | 160.1 |
| Third | 1 | 1,777 | 174 | 423 | 243.1 |
| Fourth | 1 | 2,400 | 238 | 581 | 244.1 |
| Ninth | 2 | 6,218 | 1,538 | 2,680 | 174.3 |
| PRISONER OF WAR HOSPITAL (Eighth Service Command) | 1 | 1,690 | 1,437 | 1,145 | 79.7 |

* Effective beds are for Army and non-Army patients at the general hospitals proper and exclude debarkation beds as well as a 15 percent dispersion allowance.

** Beds occupied are in the general hospitals proper and exclude patients on furlough, on sick leave, or AWOL.

HOSPITALIZATION

RESTRICTED

HOSPITALIZATION IN THE ZONE OF INTERIOR (Continued)

The personnel data shown for the general hospitals pertain to the end of September. The total number of personnel was 77,000 or 15,000 below that authorized by WD Circular 209. The shortage may be broken down as follows:

| | |
|------------------------|--------|
| Total | 15,000 |
| Medical Corps Officers | 200 |
| Nurses | 3,000 |
| Other Officers | 2,200 |
| Enlisted Men | 9,600 |

The distribution of total personnel among the service commands ranges widely from 63 per 100 authorized beds in the Fifth Service Command to 83 in the Sixth Service Command. The distribution of personnel among the individual hospitals within a given service command likewise appears subject to review.

OPERATING PERSONNEL AT GENERAL HOSPITALS
End of September 1944

| Type of Hospital | Total | Officers | | | Enlisted Men | Civil-ians |
|---|--------|----------|-------|-------|--------------|------------|
| | | MC | ANC* | Other | | |
| ALL GENERAL HOSPITALS | 77,019 | 2,882 | 5,237 | 3,028 | 29,505 | 36,367 |
| 54 GENERAL HOSPITALS (Less Debarkation and POW) | 68,109 | 2,526 | 4,621 | 2,600 | 25,880 | 32,482 |
| Service Commands | | | | | | |
| First | 2,880 | 119 | 156 | 126 | 1,457 | 1,022 |
| Second | 5,800 | 198 | 497 | 142 | 2,589 | 2,374 |
| Third | 3,681 | 120 | 285 | 108 | 1,182 | 1,986 |
| Fourth | 12,057 | 424 | 683 | 467 | 3,965 | 6,518 |
| Fifth | 8,023 | 334 | 593 | 350 | 3,007 | 3,739 |
| Sixth | 4,904 | 175 | 283 | 152 | 2,320 | 1,974 |
| Seventh | 6,860 | 193 | 369 | 291 | 2,038 | 3,969 |
| Eighth | 12,112 | 462 | 801 | 484 | 4,674 | 5,691 |
| Ninth | 10,128 | 403 | 740 | 417 | 3,891 | 4,677 |
| The Surgeon General (Walter Reed) | 1,664 | 98 | 214 | 63 | 757 | 532 |
| DEBARKATION HOSPITALS | 8,047 | 324 | 579 | 285 | 3,327 | 3,532 |
| Service Commands | | | | | | |
| Second | 1,847 | 52 | 130 | 36 | 687 | 942 |
| Third | 1,279 | 45 | 77 | 43 | 369 | 745 |
| Fourth | 2,145 | 91 | 113 | 84 | 1,009 | 848 |
| Ninth | 2,776 | 136 | 259 | 122 | 1,262 | 997 |
| PRISONER OF WAR HOSPITAL (Eighth Service Command) | 863 | 32 | 37 | 143 | 298 | 353 |

* Includes cadet nurses who are shown at 80 percent of their actual number.

While the patient-load in the general hospitals has been increasing, the number of patients in the station and regional hospital system has declined following the departure of troops from the Zone of Interior. Constant effort has been made by The Surgeon General to reduce authorized bed capacities accordingly and in compliance with Change 3, AR 40-1080. It is evident from the data which follow that the authorizations for the ASF regional hospitals have been maintained at 3.5 percent of troop strength served for station hospitalization and 0.5 percent of troop strength served for regional hospitalization purposes. The same regulation requires that the authorized capacities of station hospitals be held at 3.5 percent of troop strength served with due allowance for local conditions. By the end of October, a ratio of 3.9 percent of troop strength served had been attained. The apparent excess of 0.4 percent is attributable to a series of factors:

- a. Past experience has proved that certain posts, such as basic training centers,

RESTRICTED

HOSPITALIZATION

HOSPITALIZATION IN THE ZONE OF INTERIOR (Continued)

require additional hospitalization.

b. War Department regulations specify that the Army provide station hospital type of care for certain civilian employees working on Army industrial activities. The civilian strength is not included in the strength figure which underlies the computed ratio of 3.9 percent.

c. Analysis of the station hospitals in the Eighth Service Command reveals that German prisoner-of-war patients who were evacuated to this country as patients were occupying beds in several station hospitals at the end of October because general hospital beds were not available for them at that time.

d. As troops leave the country, many camps are being abandoned. Frequently, the service commands do not scale down authorizations from day to day, but wait a week or so before closing the station completely. A minor lag is thus introduced.

BEDS AUTHORIZED AND OCCUPIED IN STATION AND REGIONAL HOSPITALS
End of October 1944

| Command | Authorized Beds | | Effective Beds * | Beds Occupied | |
|--------------------------------|-----------------|---------------------------------|---------------------|---------------|---------------------------------|
| | Number | Percent of Troop Strength | | Number | Percent of Effective Beds |
| TOTAL | 145,485 | 4.0 | 115,028 | 92,245 | 80.2 |
| ARMY SERVICE FORCES | 94,696 | 4.0 | 74,397 | 59,429 | 79.9 |
| <u>Service Commands</u> | | | | | |
| STATION HOSPITALS | 44,241 | 3.9 | 35,393 | 29,457 | 83.2 |
| First | 233 | 3.6 | 186 | 82 | 44.1 |
| Second | 2,040 | 3.5 | 1,632 | 1,382 | 84.7 |
| Third | 4,136 | 4.4 | 3,309 | 2,925 | 88.4 |
| Fourth | 8,480 | 3.4 | 6,784 | 6,152 | 90.7 |
| Fifth | 2,075 | 4.4 | 1,660 | 1,889 | 113.8 |
| Sixth | 2,635 | 4.0 | 2,103 | 1,302 | 61.8 |
| Seventh | 3,046 | 4.0 | 2,437 | 1,330 | 54.6 |
| Eighth | 15,776 | 4.2 | 12,621 | 9,084 | 72.0 |
| Ninth | 4,762 | 3.2 | 3,810 | 4,056 | 106.5 |
| MDW | 1,058 | 3.4 | 846 | 645 | 76.2 |
| DEBARKATION HOSPITALS | | | | | |
| First** | 2,000 | 2.8 | 240 | 610 | 62.5 |
| REGIONAL HOSPITALS | 40,200 | 4.0 | 32,160 | 26,085 | 81.1 |
| First | 500 | 3.1 | 400 | 247 | 61.8 |
| Second | 1,500 | 3.7 | 1,200 | 737 | 61.4 |
| Third | 3,500 | 4.4 | 2,800 | 2,906 | 103.8 |
| Fourth | 15,250 | 3.9 | 12,200 | 10,621 | 87.1 |
| Fifth | 1,650 | 3.6 | 1,320 | 939 | 71.1 |
| Seventh | 5,000 | 3.9 | 4,000 | 3,036 | 75.9 |
| Eighth | 8,750 | 4.1 | 7,000 | 4,495 | 64.2 |
| Ninth | 4,050 | 3.9 | 3,240 | 3,104 | 95.8 |
| <u>Chief of Transportation</u> | 8,255 | 4.4 | 6,604 | 3,887 | 58.9 |
| ARMY AIR FORCES*** | 50,789 | 4.0 | 40,631 | 32,816 | 80.8 |

* Computed on basis of 20 percent dispersion factor, and exclude 1,700 debarkation beds.

** In computing authorized beds as percent of troop strength, effective beds, and beds occupied as percent of effective beds, 1,700 debarkation beds in Camp Edwards Station Hospital are excluded as well as approximately 450 of the beds occupied.

*** Army Air Forces data are as of 20 October.

HOSPITALIZATION

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HOSPITALIZATION IN THE ZONE OF INTERIOR (Continued)

e. As the non-effective rate increases during the winter months it may prove difficult to reduce bed authorizations in line with reductions in troop strength in view of the current drive to implement War Department Circular 370 and ASF Circular 318 which facilitate the discharge of men below minimum standards of induction who have no authorized positions. This drive has tended to increase the station hospital population with patients under consideration for discharge. The station hospitals under the jurisdiction of the Chief of Transportation show a bed authorization of 4.4 percent of troop strength currently served. However, the basis for authorizing beds at such hospitals is not troop strength served at any given time, but rather 3.5 percent of troop strength permanently served and 2 percent of the staging capacity of the post.

At the end of October there were altogether 92,000 beds occupied in the station and regional hospitals or 80 percent of the 115,000 effective beds obtained by deducting from authorized capacity 20 percent for dispersion. The percentage of beds occupied varies widely among the service commands. In the case of station hospitals the range is from 44 percent in the First Service Command to 114 percent in the Fifth Service Command, where the hospital census has apparently failed to decline as rapidly as has troop strength served. A similar situation exists in the Ninth Service Command. For the regional hospitals the range in the percentage of beds occupied varies from 63 percent in the Second Service Command to 104 percent in the Third Service Command. The latter figure is attributable to the very high occupancy at Fort Meade Regional Hospital, which apparently cares for a great many patients in its capacity as AGF Replacement Depot.

The following conclusions may be drawn:

a. The general hospitals are likely to reach full occupancy within the next two or three months.

b. Were it not for the transfer of a considerable number of patients into the convalescent facilities or hospitals, the general hospitals would have about 90 percent of their effective beds occupied even now.

c. The rate at which a general hospital approaches full occupancy is a function of its geographic location. Hospitals in the more populous states will be filled to capacity at an earlier date. This fact is a direct result of the policy of The Surgeon General to send patients as near their homes as possible without sacrifice in the quality of medical care.

d. The changing composition of the patients being received from overseas is increasing the proportion of long-time patients in general hospitals.

e. Although some readjustment may be indicated in personnel assignments, there is a total shortage of personnel in the general hospitals which is even more pressing.

f. The provisions of Change 3, AR 40-1080, have been substantially met. These require that the authorized bed capacities of station hospitals be reduced to 3.5 percent of the troop strength served and that the authorized bed capacities of the regional hospitals be reduced to 3.5 percent of troop strength served for station hospitalization plus 0.5 percent of troop strength served for regional hospitalization.

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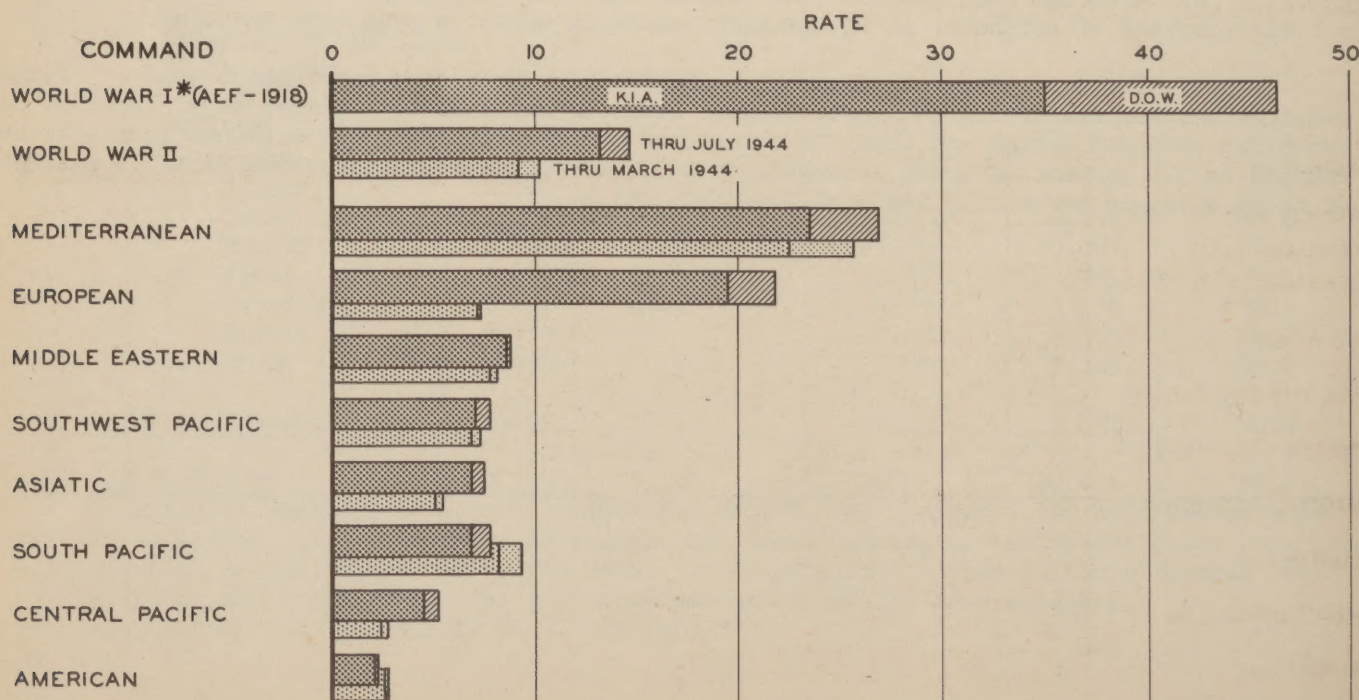
DEATHS AMONG BATTLE CASUALTIES

Two months after the opening of the western front in Europe the death rate from battle causes had increased by more than 40 percent above the cumulative rate through March. From its level of 10 deaths per 1,000 men per year overseas from December 1941 through March 1944, it had advanced to almost 15 by the end of July, the latest month for which reasonably complete AGO returns are available. The chart below gives the rates separately for men killed in action and for those who died of wounds, for each theater and for the AEF in World War I. For each theater the cumulative rates through March 1944 are compared with those through July 1944. The latter rates are higher in all areas except the American theaters and the South Pacific. The figures on killed in action are 55,500 through July and 61,200 through September, in comparison with 36,700 for the AEF. On the other hand the totals for deaths from wounds are only 7,000 through July and 7,700 through September, the AEF total being 13,700.

Several factors must be taken into consideration when World War I and II figures are compared. About 44,000 men are reported as missing in action through July 1944, some of whom have already been declared dead and many more of whom will eventually be included among those killed in action. If all the missing were assumed to be killed, the total battle death rate for World War II would be 25 per thousand men per year, or slightly more than half that for World War I. Another factor is that a great deal of strength has been poured into theaters prior to the opening of heavy offensive action or simply for strategic occupation. Finally, the proportion of service to combat troops is much higher during this war than last, which tends to lower the average battle casualty rates for entire theaters. In the European Theater, the total death rate from battle causes for the entire period is 22, but for June and July, two months of heavy fighting on the continent, 59 per thousand men per year were killed in action as against 35 per thousand men per year during World War I. The rate for deaths from wounds received during this period in the European Theater is, however, only 9.4 or only about 70 percent of the AEF rate of 13.0 deaths per 1,000 men per year. The reporting of deaths from wounds is far from satisfactory, and it is probable that many men seen alive after wounding, but later dying of wounds, are classified as killed in action. For a discussion of this and related problems, see HEALTH for April 1944.

The proportion of killed among all men hit is not as stable as might be expected. Since the end of 1942, the killed have ranged between 20 and 47 percent of all men hit each month. The reason is that these percentages differ markedly for reported air and ground force casualties, so that the ratio for any month depends on the relative amount of air activity. Through September 1944, 56 percent of the air force personnel hit were reported killed in comparison with 20 percent for ground force personnel, the missing being excluded. In the chart below, the proportion of killed among all men hit is compared with the propor-

BATTLE DEATHS PER THOUSAND STRENGTH PER YEAR, OVERSEAS COMMANDS



* Excluding gas.

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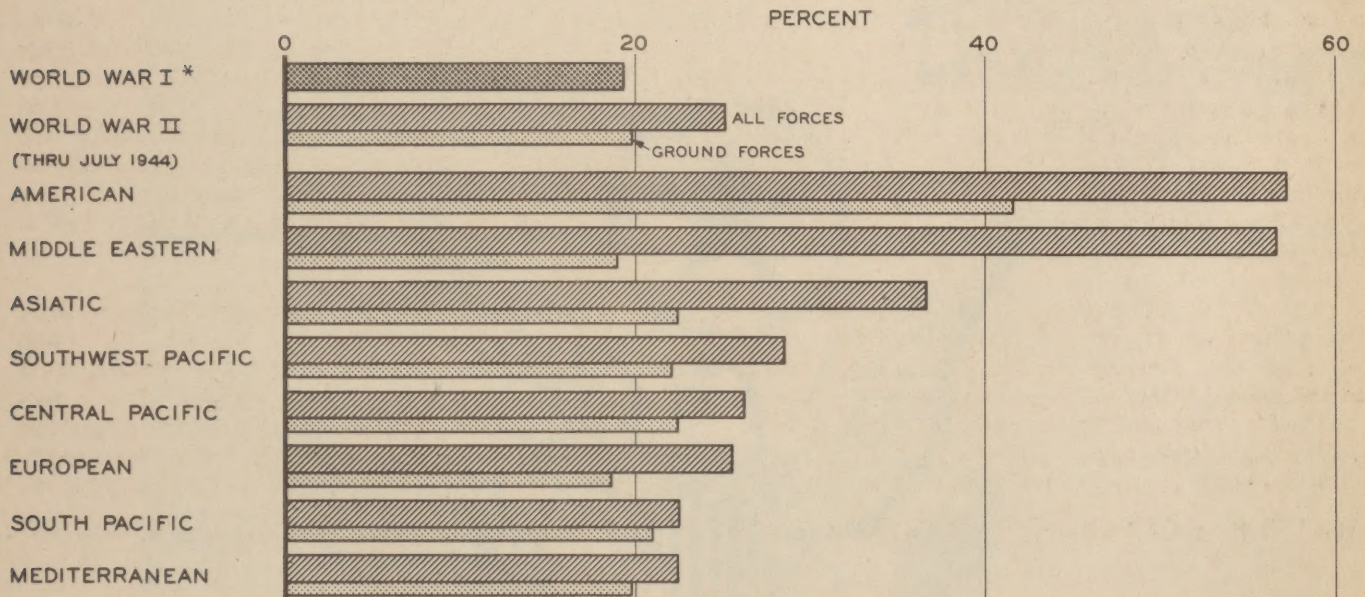
DEATHS AMONG BATTLE CASUALTIES (Continued)

tion for ground force casualties in each overseas theater. Except for casualties in the American theaters, the ratio of killed to wounded among ground personnel is quite similar for all theaters. The experience of these areas is so small that the sinking of a troop ship with the loss of 400 men, mostly infantry, is sufficient to cause the disproportion. The number of casualties has also been very small in the Middle East.

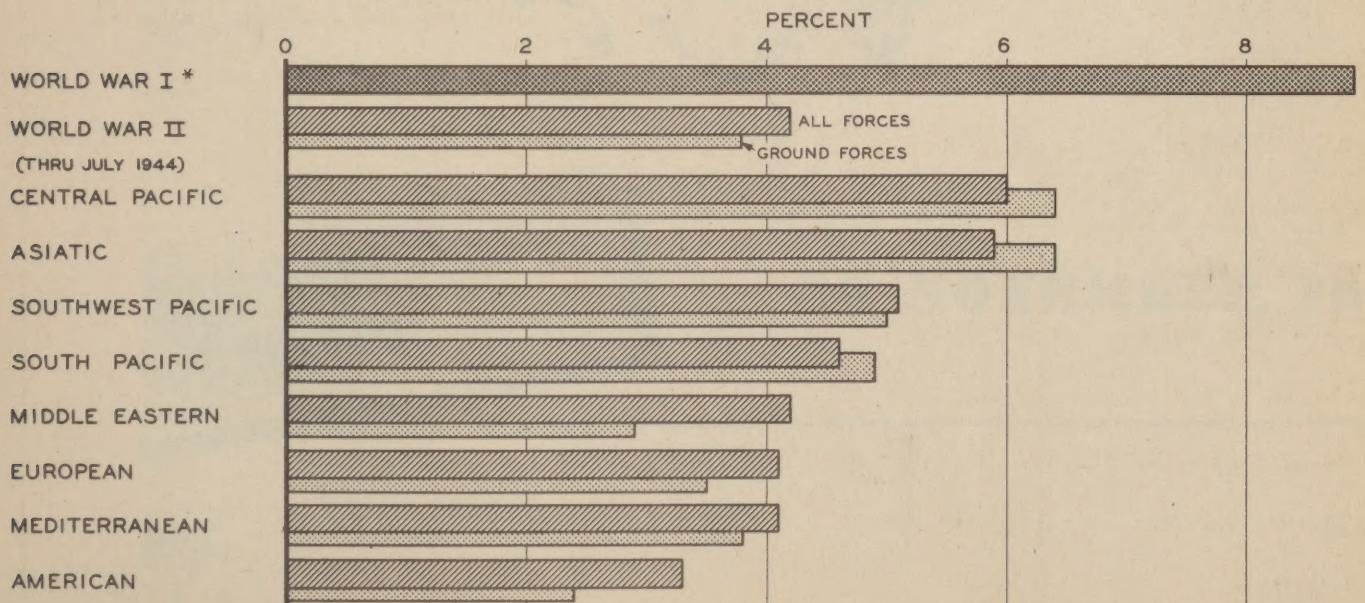
The bottom panel summarizes the most recent AGO information on the proportion of hospitalized wounded who have died of wounds. It is generally believed that the percentage is less than that shown, possibly because of the exclusion of the more lightly wounded. However, as discussed in HEALTH for April, failure to distinguish between the killed and those who died of wounds may provide an opposite bias of at least equal force. One can be sure that the current fatality rate is lower than that of 8.1 percent reported for World War I, but there is not guarantee that the correct figure is not nearer 5 than the often quoted figure of 3 percent. The theater variation shown in the chart is taken to reflect differences in reporting. The mass statistics now being gathered are evidently not sufficiently refined to provide an incontrovertible estimate of this important statistic.

FATALITY AMONG WOUNDED MEN

PERCENT OF MEN HIT WHO ARE KILLED IN ACTION



PERCENT OF MEN WOUNDED DYING OF WOUNDS



* Excluding gas.

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